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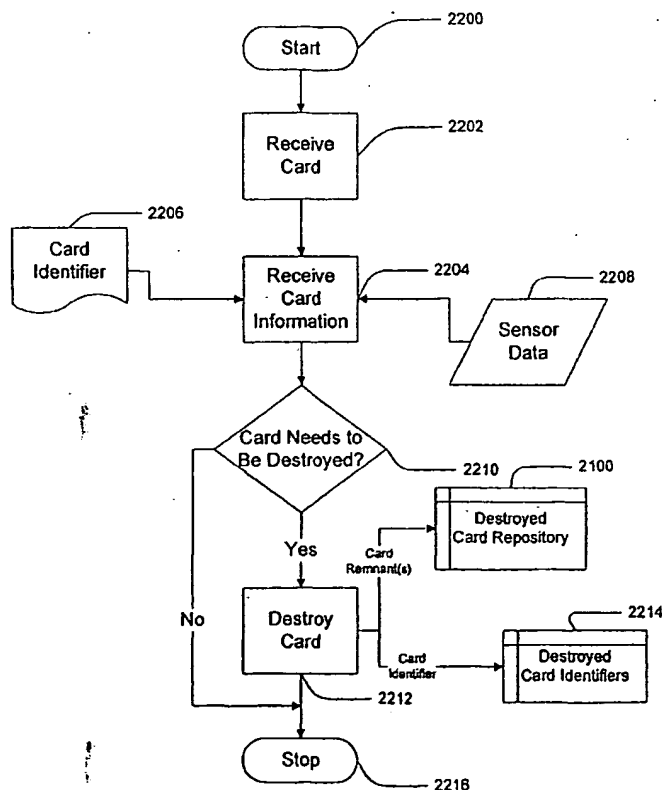
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(54) Title: REWRITABLE CARD PRINTER FOR A GAMING MACHINE



(57) Abstract: A rewritable card printer useful as a gaming printer. The rewritable card printer includes a print module coupled to one or more separate card magazines, each having independent card drives. A printer controller controls the operation of the print module and the one or more card magazines. Either a card magazine or the print module may include a card-destroying device. The rewritable card printer may be instructed to identify a particular rewritable card during processing and destroy the identified card. The rewritable card printer may also determine that a card should be destroyed because the card is no longer usable. Once the card is destroyed, its remnants are deposited in a destroyed card repository or trash bin associated with a gaming machine.

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## REWRITABLE CARD PRINTER FOR A GAMING MACHINE

## 5 CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of U.S. Patent Application No. 10/654,521 entitled "REWRITABLE CARD PRINTER" and is related to U.S. Patent Application entitled "PAPER MOTION DETECTOR IN A GAMING MACHINE", attorney docket number 50820/FLC/F392 filed August 12, 2003, U.S. Patent Application Entitled "GAMING MACHINE PRINTER", attorney docket number 49970/FLC/F392 filed July 9, 2003, and U.S. Patent Application No. Application No. 10/136,897, filed April 30, 2002, and the contents of each are hereby  
15 incorporated by reference as if stated herein in full.

## BACKGROUND OF THE INVENTION

This invention relates generally to gaming printers and more specifically to printers for use in cashless gaming machines that use rewritable cards.  
20

The gaming machine manufacturing industry provides a variety of gaming machines for the amusement of gaming machine players. An exemplary gaming machine is a slot machine. A slot machine is an electro-mechanical game wherein chance or the skill of a player determines the outcome of the game. Slot machines are usually found in casinos or other more informal gaming establishments.  
25

Gaming machine manufacturers have more recently introduced cashless enabled games to the market and these have begun to find wide acceptance in the gaming industry. Cashless enabled games are so named because they can conduct financial exchanges using a mixture of traditional currencies and rewritable cards. Typically, a cashless enabled game has a gaming printer to produce rewritable cards and a rewritable card reader that supports automatic  
30 reading of rewritable cards. To coordinate the activities of multiple cashless enabled games, one or more cashless enabled games may be electronically coupled to a cashless  
35

1 enabled game system that controls the cashless operations of  
a cashless enabled game.

When a player cashes out using a cashless enabled game  
coupled to a cashless enabled game system, the cashless  
5 enabled game signals the system and the system may determine  
the type of pay out presented to the player. Depending on  
the size of the pay out, the cashless enabled game system  
may cause the cashless enabled game to present coins in the  
traditional method of a slot machine, or the cashless  
10 enabled game system may cause a gaming printer in the  
cashless enabled game to produce a rewritable card for the  
value of the pay out. The rewritable card may then be  
redeemed in a variety of ways. For example, the rewritable  
card may be redeemed for cash at a cashier's cage or used  
15 with another cashless enabled game. In order to use the  
rewritable card in a cashless enabled game, the rewritable  
card is inserted into a rewritable card reader of another  
cashless enabled game at a participating casino and the  
cashless enabled game system recognizes the rewritable card,  
20 redeems the rewritable card, and places an appropriate  
amount of playing credits on the cashless enabled game.

Cashless enabled games have found an increasing  
acceptance and use in the gaming industry, both with players  
who enjoy the speed of play and ease of transporting their  
25 winnings around the casino and casinos who have realized  
significant labor savings in the form of reduced coin hopper  
reloads in the games, and an increase in revenue because of  
the speed of play. Practical field experience with printers  
used in cashless enabled games has illustrated that there  
30 are areas for improvement in the current printer designs and  
implementation. These areas in need of improvement include  
methods and means for using rewritable card media for  
printing of vouchers.

### 35 SUMMARY OF THE INVENTION

A rewritable card printer useful as a gaming printer is  
provided. The rewritable card printer includes a print  
module coupled to one or more separate card magazines, each

1 having independent card drives. A printer controller  
controls the operation of the print module and the one or  
more card magazines. Either a card magazine or the print  
module may include a card-destroying device. The rewritable  
5 card printer may be instructed to identify a particular  
rewritable card during processing and destroy the identified  
card. The rewritable card printer may also determine that a  
card should be destroyed because the card is no longer  
usable. Once the card is destroyed, its remnants are  
10 deposited in a destroyed card repository or trash bin  
associated with a gaming machine.

In an aspect of the invention, a rewritable card  
printer has a card magazine coupled to a print module with  
the card magazine including a card-destroying device. A  
15 printer controller is electronically coupled to the print  
module and the card magazine and has a processor a memory  
coupled to the processor. The memory includes program  
instructions executable by the processor. Included in the  
program instructions are instructions to receive a card and  
20 destroy the card using the card-destroying device.

In another aspect of the invention, the card-destroying  
device is a mechanical device and destroying the card  
further includes cutting the card into a plurality of  
remnants.

25 In another aspect of the invention, the card-destroying  
device is a thermal erase head and the card includes a  
rewritable thermal film. The erase head destroys the card  
by heating the card to a temperature that destroys the  
rewritable thermal film.

30 In another aspect of the invention, the card-destroying  
device is an electromagnetic erase head and the card  
includes a rewritable magnetic strip. The rewritable card  
printer destroys the card by degaussing the magnetic strip  
using the electromagnetic erase head.

35 In another aspect of the invention, the program  
instructions further include instructing the rewritable card  
printer to read card information from the card and determine  
that the card should be destroyed using the card

1 information.

In another aspect of the invention, the program instructions further include instructing the rewritable card printer to receive a card identifier and determine if the  
5 card should be destroyed using the card information and the card identifier.

In another aspect of the invention, the card-destroying device is a mechanical device and destroying the card further comprises deforming the card.

10

#### BRIEF DESCRIPTION OF THE DRAWINGS

These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description, appended claims, and  
15 accompanying drawings where:

FIG. 1 is a block diagram of a cashless gaming machine and system in accordance with an exemplary embodiment of the present invention;

FIG. 2a is an illustration of a rewritable card in accordance with an exemplary embodiment of the present  
20 invention;

FIG. 2b is an illustration of another portion of a rewritable card in accordance with an exemplary embodiment of the present invention;

FIG. 2c is an illustration of another portion of a rewritable card having a static memory in accordance with an  
25 exemplary embodiment of the present invention;

FIG. 3 is a block diagram illustrating a security feature employing capacitive inks in accordance with an  
30 exemplary embodiment of the present invention;

FIG. 4 is a block diagram of a security feature utilizing an optical signature in accordance with an exemplary embodiment of the present invention;

FIG. 5 is a block diagram of a security feature using randomly deposited radio wave sensitive fibers embedded in a  
35 rewritable card in accordance with an exemplary embodiment of the present invention;

FIG. 6 is a block diagram of the operation of a

1       rewritable card printer in accordance with an exemplary  
embodiment of the present invention;

5       FIG. 7a is a block diagram of a rewritable card printer  
in accordance with an exemplary embodiment of the present  
invention;

FIG. 7b is an architecture diagram of a rewritable card  
printer employing components having integral controllers in  
accordance with an exemplary embodiment of the present  
invention;

10       FIG. 8 is an isometric view of a rewritable card  
printer in accordance with an exemplary embodiment of the  
present invention;

15       FIG. 9 is an isometric view of a rewritable card  
printer with the card magazine opened in accordance with an  
exemplary embodiment of the present invention;

FIG. 10 is a top plan view of a rewritable card printer  
in accordance with an exemplary embodiment of the present  
invention;

20       FIG. 11a is side elevation view of a rewritable card  
printer in accordance with an exemplary embodiment of the  
present invention;

FIG. 11b is side elevation view of a rewritable card  
charging process in accordance with an exemplary embodiment  
of the present invention;

25       FIG. 11c is a side elevation view of a rewritable card  
printer with a card magazine having two independent magazine  
card drives in accordance with an exemplary embodiment of  
the present invention;

30       FIG. 11d is a side elevation view of a card magazine  
having a plurality of card storage locations serviced by a  
single card magazine drive in accordance with an exemplary  
embodiment of the present invention;

35       FIG. 11e is side elevation view of a rewritable card  
printer slidably coupled to a gaming machine in accordance  
with an exemplary embodiment of the present invention;

FIG. 12 is a process flow diagram of a rewritable card  
printing process in accordance with an exemplary embodiment  
of the present invention;

1           FIG. 13 is a process flow diagram of a card escrowing process used by a rewritable card printer in accordance with an exemplary embodiment of the present invention;

5           FIG. 14 is a card retrieval process used by a rewritable card printer having companion magazines in accordance with an exemplary embodiment of the present invention;

10          FIG. 15 is a process flow diagram of a card location process used by a rewritable card printer having multiple card magazines in accordance with an exemplary embodiment of the present invention;

          FIG. 16 is a process flow diagram of a card replacement process in accordance with the present invention;

15          FIG. 17 is a process flow diagram of a programming process using a rewritable card in accordance with an exemplary embodiment of the present invention;

          FIG. 18 is a process flow diagram of a card information storage process in accordance with an exemplary embodiment of the present invention;

20          FIG. 19 is a process flow diagram of a card information retrieval process in accordance with an exemplary embodiment of the present invention;

25          FIG. 20 is a stored card status printing process in accordance with an exemplary embodiment of the present invention;

          FIG. 21 is a side elevation view of a rewritable card printer, a card magazine, and a destroyed card repository in accordance with an exemplary embodiment of the present invention; and

30          FIG. 22 is a process flow diagram of a card destruction process in accordance with an exemplary embodiment of the present invention.

#### DETAILED DESCRIPTION

35          FIG. 1 is a block diagram of a cashless enabled gaming machine coupled to a rewritable card printer in accordance with an exemplary embodiment of the present invention. A cashless gaming system includes a cashless gaming system



1 controller 100 hosted by a system host 102 coupled 104 to  
one or more cashless enabled games 106. A cashless enabled  
game includes a game controller 108 that controls the  
operation of the cashless enabled game. The game controller  
5 is coupled to a rewritable card printer 110. The cashless  
enabled game uses the rewritable card printer to write  
rewritable card media such as rewritable card 114. The  
rewritable card printer includes card identification and  
printing algorithms 113 used in conjunction with rewritable  
10 cards. The rewritable card includes the cash-out  
information for a player.

The rewritable card printer may also be coupled (112)  
to the host system and cashless gaming controller. The  
rewritable card may be redeemed (116) in a variety of ways.  
15 The rewritable card may be redeemed by a human cashier or  
card reader 122 at a game table 124, or a human cashier or  
card reader 126 at a cashier's cage or kiosk 128, or by a  
card reader 118 at another cashless enabled game 120.  
Redemption is only possible after the rewritable card passes  
20 a verification of account information 130 and validation  
using security features 132 included in the rewritable card.

FIG. 2a is an illustration of a rewritable card in  
accordance with an exemplary embodiment of the present  
invention. The rewritable card shown is produced from  
25 commands issued by the cashless enabled game to the gaming  
printer in response to a player's request to cash-out. The  
rewritable card 114 includes features such as a validation  
number, printed in both a human readable form such as a  
character string 200 and in a machine-readable form such as  
30 a bar code 202, time and date stamps 204, cash-out amount  
206, casino location information 208, cashless enabled game  
identifier 210, and an indication of an expiration date 212.  
Included in the card is a security feature 132 that may take  
one or more forms as discussed below.

35 In one rewriteable card media in accordance with an  
exemplary embodiment of the present invention, one face of  
the rewriteable card includes a layer of writable and  
erasable thermally sensitive film. The thermal film becomes

1       opaque at one temperature level but becomes transparent at  
another temperature. This effect can be used to create a  
thermally rewritable card.

5       FIG. 2b is an illustration of another side of a  
rewriteable card in accordance with an exemplary embodiment  
of the present invention. The rewriteable card 114 may also  
include a read/write magnetic strip 214 for encoding of any  
of the information described above.

10       In addition, the magnetic strip may be used to transmit  
information to the rewritable card printer. For example,  
the magnetic strip may encode instructions such as  
configuration flags or programming instructions used to  
reconfigure or reprogram a rewritable card printer.

15       FIG. 2c is an illustration of another portion of a  
rewriteable card having a static memory in accordance with  
an exemplary embodiment of the present invention. The  
rewriteable card 114 may also include a static memory 216  
embedded in the rewritable card so that the rewritable card  
can be used as a "smart" card for encoding of any of the  
20       information described above.

      In addition, the static memory may be used to transmit  
information to the rewritable card printer. For example,  
the static memory may encode instructions such as  
configuration flags or programming instructions used to  
25       reconfigure or reprogram a rewritable card printer.

      FIG. 3 is a block diagram illustrating a security  
feature employing capacitive inks in accordance with an  
exemplary embodiment of the present invention. A rewritable  
card 114 may be imprinted with metallic inks to create one  
30       or more capacitors in the rewriteable card. The one or more  
capacitors may be used to create a security feature in the  
form of a capacitor structure 300 whose capacitance may be  
detected by a capacitance sensor 302 coupled to the  
rewritable card. As the card moves across the sensor (as  
35       indicated by arrow 304) the sensor senses changes in the  
localized capacitance of the card and generates (306) a  
security signature signal 308 corresponding to the structure  
of the capacitor structure 300 in the rewritable card. This

1 security signature signal may be used to identify each  
rewritable card used in a cashless enabled gaming system.

FIG. 4 is a block diagram of a security feature  
utilizing an optical signature in accordance with an  
5 exemplary embodiment of the present invention. To use this  
security feature, a rewritable card 114 includes a structure  
400 having a variable optical density or optical  
reflectivity that is not apparent under normal lighting  
conditions. However, when a high intensity light, such as a  
10 laser beam 402 generated by a laser diode 404 or other laser  
beam generating device, is transmitted through the  
rewritable card, a light sensor 406 may detect fluctuations  
in the intensity of the transmitted or reflected laser beam  
caused by the structure. If the card is moved past the  
15 laser beam (as indicated by arrow 408) the moving structure  
generates a changing light signal that is received by the  
light sensor. In response to the changing light signal, the  
light sensor generates (410) a time varying security  
signature signal 412 that may be used as a signature to  
20 uniquely identify each rewritable card used in a cashless  
gaming system.

FIG. 5 is a block diagram of a security feature using  
randomly deposited radio wave sensitive fibers or inks  
embedded in a rewritable card in accordance with an  
25 exemplary embodiment of the present invention. A rewritable  
card 114 may include a layer of randomly deposited radio  
wave sensitive fibers 500 embedded within the card. An  
excitor 502 is used to transmit short pulses of radio waves  
504 into the layer of fibers. In response to the radio  
30 waves, the fibers generate a resultant radio frequency  
signal 506 that may be detected by a sensor 508. If the  
rewritable card is moving (as indicated by direction arrow  
509) as the fibers are being excited, the sensor receives a  
time varying radio frequency signal generated by the excited  
35 and moving fibers. In response to the time varying radio  
frequency signal, the sensor generates (510) a time varying  
security signature signal 512 that may be used to uniquely  
identify each rewritable card in a cashless gaming system.

1        FIG. 6 is a block diagram of the operation of a  
rewritable card printer in accordance with an exemplary  
embodiment of the present invention. A rewritable card  
printer includes a security feature reader 600 for reading a  
5        security feature embedded in a rewritable card 114. The  
type of security feature reader is dependent on the type of  
security features used with the rewritable card. The  
security feature reader supplies the appropriate excitation  
energy and sensor to generate a security signature signal as  
10       previously described.

      The rewritable card printer also includes an erase head  
602 for erasing a rewritable card prior to printing on the  
rewritable card. The erase head raises the temperature of  
the rewritable thermal film to an erasing temperature and  
15       any images previously written to the rewritable card are  
erased.

      The rewritable card printer also includes a print head  
604 for printing on the rewritable card. The print head  
raises the temperature of the thermal film on the rewritable  
20       card to the writing temperature and indicia are printed onto  
the rewritable card as a result.

      The rewritable card printer also includes an optical  
scanning device 605 for reading the printed indicia on the  
rewritable card. The operation of such a device is more  
25       fully detailed in U.S. Patent Application No. 10/136,897,  
filed April 30, 2002, the contents of which are hereby  
incorporated by reference as if stated herein in full.

      The rewritable card printer also includes a magnetic  
strip read/write head 607 for reading from, and writing to a  
30       magnetic strip 214 (of FIG. 2) on the rewritable card. In  
addition, the erase head may include the capability to erase  
or degauss any magnetic strip.

      The rewritable card printer includes a printer  
controller 606 operably coupled to the security feature  
35       reader. The security feature reader generates a security  
signature signal 608 that is transmitted to the printer  
controller.

      The printer controller is also coupled to the erase

1 head. The printer controller generates an erase control  
signal 612 that is transmitted to the erase head. In  
response to the erase head signal, the erase head heats the  
rewritable card until all indicia are erased from the  
5 rewritable card.

The printer controller is also coupled to the print  
head. The printer controller transmits print head control  
signals 616 to the print head. In response to the print  
head control signals, the print head heats a thermal element  
10 for each dot that is to be imaged on the rewritable card.  
The print head typically creates dot images to a granularity  
of 12 dots per millimeter, each dot image using a separate  
thermal element to create a dot image.

The printer controller is also coupled to the optical  
15 scanner 605. As the optical scanner scans the printed  
indicia on the rewritable card, the optical scanner  
transmits scanned signals 617 to the printer controller.

The printer controller is also coupled to the magnetic  
strip read/write head 607. The printer controller transmits  
20 magnetic strip write signals and receives magnetic strip  
read signals to and from (619) the magnetic strip read/write  
head.

The printer controller may also be coupled to a static  
memory read/write connector 622. The printer controller  
25 transmits static memory write signals and receives static  
memory read signals to and from (624) the static memory  
read/write head.

In one embodiment of a rewritable card printer in  
accordance with the present invention, a game controller 108  
30 is operably coupled to the printer controller. The printer  
controller receives printer control instructions 614,  
including card information for writing to the rewritable  
card, from the game controller. The printer controller may  
also transmit printer status and card identification signals  
35 610 to the game controller.

FIG. 7a is a block diagram of a rewritable card printer  
in accordance with an exemplary embodiment of the present  
invention. A rewritable card printer 110 includes a printer

1 controller 606, a print module 702, and one or more card  
magazines 704.

5 The print module includes a print card drive 706 that  
moves cards through the print module. The print card drive  
is reversible such that a card may be fed through the print  
module in more than one direction by the print card drive.  
The print card drive includes a card motion sensor 707 for  
10 sensing card movement within the print card drive. A more  
detailed discussion of printer media motion detection within  
a printer is presented in U.S. Patent Application entitled  
"PAPER MOTION DETECTOR IN A GAMING MACHINE", attorney docket  
number 50820/FLC/F392 filed August 12, 2003, the contents of  
which are hereby incorporated by reference as if stated  
15 herein in full. The print drive further includes an  
embossing detector 709 that may be used to sense when an  
embossed item, such as a conventional credit card, is  
inserted into the print module. The embossing detector may  
be a mechanical device, such as a limit switch, that  
20 contacts an inserted card and detects any embossing. If an  
embossed card is inserted into the rewritable card printer,  
the rewritable card printer may not attempt to write to the  
card, only read the card.

The print module further includes a security feature  
reading device 600 for reading any security features  
25 included in the card. The print module further includes a  
print head 604 for writing indicia to the rewritable card  
and an erase head 602 for erasing the indicia from the  
rewritable card. The print module further includes an  
optical scanning device 605 for scanning the indicia printed  
30 onto a rewritable card. The print module further includes a  
magnetic strip read/write head 607 used to read and write  
from and to a rewritable card's magnetic strip. The print  
module is removably and electronically coupled to the  
printer controller and removably and mechanically coupled to  
35 the card magazine.

In operation, the print module receives printer control  
signals from the printer controller. In response to the  
printer control signals, the print module scans rewritable

1 cards for the presence and value of any security feature in  
the rewritable card. As the print module scans the  
rewritable card, the security feature reading device  
5 generates a previously described security signature signal  
that is transmitted to the printer controller. In addition,  
the print module thermally prints on the rewritable cards,  
and thermally erases the rewritable cards, under the control  
of the printer controller. The print module may also  
10 receive a rewritable card from a player and transmit a  
rewritable card detection signal to the printer controller.

The print module may also include a static memory  
read/write connector 622 for coupling to a "smart" card  
having a readable/writable static memory. The printer  
controller transmits static memory write signals and  
15 receives static memory read signals to and from the static  
memory read/write head.

The one or more independently controlled card magazines  
store rewritable cards and provide the rewritable cards to  
the printer module on command from the printer controller.  
20 Each card magazine may include one or more magazine card  
drives 710 for moving cards into and out of the magazine.  
Each card magazine also includes a card storage area 712 for  
storage of rewritable cards. In operation, the card  
magazine receives card magazine control signals from the  
25 printer controller. In response to the control signals, the  
card magazine feeds cards to the printer from the card  
storage area using the magazine card drive. In response to  
the card magazine control signals, the card magazine may  
also receive rewritable cards from the print module and  
30 store the rewritable cards in the card storage area. The  
card magazine may also include one or more card sensors 714  
used to detect the number of cards stored in the card  
storage area. The card sensors sense the quantity of cards  
stored in the card storage area and transmit card count  
35 signals to the printer controller for further processing.  
The card magazine may also include a read/write static  
memory 715 for semi-permanent storage of card information  
about cards stored in the card magazine.

1       The printer controller includes a processor 716 coupled  
to a main memory 718 by a system bus 720. The printer  
controller also includes a storage memory 722 coupled to the  
processor by the bus. The storage memory stores programming  
5       instructions 113, executable by the processor to implement  
the features of a rewritable card printer. The storage  
memory also includes printer and card information 724 stored  
and used by the processor. The printer and card information  
includes information received by the printer controller  
10       about the status of the print module and card magazine and  
also about the status and identity of any cards stored in  
the card magazines or being operated on by the print module.  
The types of status information may include an image of a  
last printed rewritable card as scanned by the optical  
15       scanning device and the current status, such as millimeters  
of advancement, of a card currently in the print module.

      The printer controller also includes an Input/Output  
(I/O) device 726 coupled to the processor by the system bus.  
The I/O device is used by the printer controller to transmit  
20       control signals to the print module and the card magazine.  
The I/O device may also be used by the printer controller to  
receive security feature and status signals from the print  
module and card magazine.

      One or more communications devices 728 may be coupled  
25       to the system bus for use by the printer controller to  
communicate with a cashless gaming system host 102 or a game  
controller 108 (both of FIG. 1). The printer controller  
uses the communication devices to receive commands, program  
instructions, and card information from the external  
30       devices. In addition, the printer controller may use the  
communication devices to transmit printer status information  
to the external devices. Other communication devices may  
also be used by the printer controller to couple in a secure  
fashion over a local area network 732 for administrative or  
35       other purposes.

      Additional communication devices and channels may be  
provided for communication with other peripheral devices as  
needed. For example, one communication device may be



1 provided with a local communications port, accessible from  
an exterior of a gaming machine hosting the rewritable card  
printer, that a technician may use to communicate with the  
printer controller during servicing using an external  
5 controller 730. The external controller may communicate  
with the printer controller using an infrared link, other  
short-range wireless communication link, or a hard link  
with an external connector in a secure manner.

The processor may be further coupled to an  
10 encryption/decryption module 740 that may be used to encrypt  
and decrypt messages encoded using an encryption standard.  
This enables the printer controller to engage in secure  
transactions with external devices. The processor may  
access the display device either as a component through the  
15 bus as shown or as an external device through a  
communications device using a high level communications  
protocol. In addition, the printer controller may also  
include program instructions to perform  
encryption/decryption services as well.

20 The processor may be further coupled to a display  
device 742 that may be used to display printer status  
information or card information. For example, the display  
may be used to display an "as-scanned" version of the most  
recently printed and scanned card. The processor may access  
25 the display device either as a component through the I/O  
device or as an external device through a communications  
device.

In operation, the processor loads the programming  
instructions into the main memory and executes the  
30 programming instructions to implement the features of a  
rewritable card printer as described herein.

As illustrated, the printer controller is shown as  
being electronically coupled to the print module and card  
magazine without any mechanical coupling. The printer  
35 controller may be mounted in a variety of ways and may be  
incorporated into various components of either the  
rewritable card printer or the game hosting the rewritable  
card printer. For example, the printer controller may be

1 attached to and supported by the print module, the card  
magazine, or the host game as may be required to  
mechanically integrate the rewritable card printer into the  
host game.

5 FIG. 7b is an architecture diagram of a rewritable card  
printer employing components having integral controllers in  
accordance with an exemplary embodiment of the present  
invention. A rewritable card printer 110 may be composed of  
a printer controller 606 that communicates with components  
10 and modules of the rewritable card printer using a  
communications link 749. The communications link may use  
either serial or parallel communications protocols to  
communicate with the components of the rewritable card  
printer. In this embodiment a print module 750 includes a  
15 print module controller 752 coupled to the printer  
controller. To control the operations of the print module,  
the printer controller transmits high level commands and  
status requests to the print module. In response, the print  
module performs the commands and transmits the requested  
20 information.

One or more card magazines 754 may also have integral  
card magazine controllers that are coupled to the printer  
controller via the communications link. To control the  
operations of the card magazine, the printer controller  
25 transmits high level commands and status requests to the  
card magazine. In response, the card magazine performs the  
commands and transmits the requested information to the  
printer controller.

The internal architecture of the rewritable card  
30 printer may be extended to external devices 758 as well,  
each having its own internal controller 760. In this  
embodiment, the printer controller communicates with the  
external device using high-level commands. In response, the  
external device performs the commands and transmits any  
35 requested information to the printer controller. An example  
of an external device having its own internal controller  
includes an external card magazine or cassette used to load  
cards into, or retrieve cards from, the rewritable card

1 printer.

FIG. 8 is an isometric view of a rewritable card printer in accordance with an exemplary embodiment of the present invention. As illustrated, the rewritable card  
5 printer 110 includes a print module 702 and one or more card magazines 704 mechanically coupled on a base 800. The rewritable card printer includes a front bezel 802 through which a rewritable card 114 may be fed by the print module's print card drive 706, either into or out of the rewritable  
10 card printer as previously described. The card magazine is positioned on the base such that the card magazine's magazine card drive 710 may feed rewritable cards to and receive rewritable cards from the print module as previously described. The print module and the magazine drive are  
15 separately mounted to the base and each may be separately serviced in the field without affecting the operation of the other. In addition, each component may be removed from the rewritable card printer and replaced without removing the power to the rewritable card printer.

20 As the print module and card magazine are separately mounted and controllable, the orientation of the print module and card magazine may be altered as needed to suit the mechanical requirements of a host game. For example the distance between the print module and the card magazine may  
25 be altered in order to accommodate a shorter printer bay included in a host game.

In one card magazine in accordance with an exemplary embodiment of the present invention, the cards are stored in the card magazine at an angle, up to 90 degrees, relative to  
30 the orientation to a card as it is fed into or out of a print module. This allows the card magazine to accommodate a larger number of cards in a given space, thus enhancing the card magazine's storage capabilities. In operation, the magazine card drive receives the card from the print module.  
35 or another card magazine and tilts the card as it is added to the card storage area. When a card is retrieved from the card magazine, the magazine card drive reorients the card into a proper position for presentation to the print module.

1           FIG. 9 is an isometric view of a rewritable card  
printer with the card magazine opened in accordance with an  
exemplary embodiment of the present invention. As  
illustrated, the rewritable card printer 110 includes a  
5   print module 702 and one or more card magazines 704  
mechanically coupled on a base 800. The rewritable card  
printer includes a front bezel 802 through which a  
rewritable card 114 may be fed by the print module's print  
card drive 706, either into or out of the rewritable card  
10   printer, as previously described. The card magazine is  
positioned on the base such that the card magazine's  
magazine card drive 710 may feed rewritable cards to and  
receive rewritable cards from the print module as previously  
described. The magazine card drive is removably coupled to  
15   the card storage area 712 by a hinge 900 such that the  
magazine may be opened to allow access to the card storage  
area.

A cleaning device 902 (shown through a cutaway in the  
front bezel 802) is attached to the print module such that  
20   incoming rewritable cards are cleaned before they enter the  
print module. The cleaning device may include flexible  
solid or bristled wiper elements that contact the card as it  
is taken into the print module. The wiper elements may be  
conductive so as to remove static surface charges from the  
25   card as it moves in the card printer. The wiper elements  
may also be charged so as to electrically attract and  
collect particles of dust and dirt from the card. As the  
print module's print card drive is reversible, the incoming  
card may be passed repeatedly, back and forth, through the  
30   cleaning element as needed.

In other print modules in accordance with other  
exemplary embodiments of the present invention, the cleaning  
device may be located within the print module, within the  
card magazine, or between the print module and a card  
35   magazine. In other rewritable card printers in accordance  
with exemplary embodiments of the present invention, the  
cleaning device is a separate device and not integrated with  
either a print module or a card magazine. Instead, the

1     cleaning device is a separate motorized device similar to a  
card magazine and is electronically coupled to a printer  
controller.

5     FIG. 10 is a top plan view of a rewritable card printer  
in accordance with an exemplary embodiment of the present  
invention. The rewritable card printer 110 includes a print  
module 702 and one or more card magazines 704a, 704b, and  
704c that are mechanically coupled on a base 800. The  
10     rewritable card printer includes a front bezel 802 through  
which a rewritable card 114 may be fed by the print module's  
print card drive 706, either into or out of the rewritable  
card printer, as previously described. The plan view also  
illustrates a possible relative position of a security  
15     feature reading device 600, a print head 604, and an erase  
head 602 within the print module. Card magazine 704a is  
positioned on the base such that the card magazine's  
magazine card drive 710a may feed rewritable cards to and  
receive rewritable cards from the print module as previously  
described.

20     In the top view, additional positions for card  
magazines are illustrated. These additional card magazine  
positions may be used to mount one or more card magazines in  
various relationships to the print module as may be dictated  
by an existing printer bay in a host game. In one possible  
25     configuration, a card magazine 704a is located to the side  
of the print module. In another configuration, two card  
magazines, 704b and 704c, are mounted such that the card  
magazines may feed and receive rewritable cards to and from  
each other as companions. As illustrated, card magazine  
30     704b is the primary card magazine and may feed cards into  
and receive cards from the print module. Card magazine 704c  
is a secondary card magazine that may feed cards to and  
receive cards from the primary card magazine.

35     Card magazines configured so as to allow movement of  
cards between the card magazines are herein termed  
"companion" magazines. Companion card magazines may be used  
to move rewritable cards around such that individual  
rewritable cards may be identified and retrieved from

1 storage. This is because a card magazine with a single  
magazine card drive may be used as a Last In First Out  
(LIFO) rewritable card "memory" where the last rewritable  
card placed into the card magazine will be the first  
5 rewritable card retrieved from the card magazine when a  
rewritable card is requested. Through the use of multiple  
magazine drives serving a single rewritable card storage  
location, different styles of rewritable card memories may  
be implemented such as a First In First Out (FIFO) memory.

10 Companion card magazines may also be used to store  
different kinds of rewritable cards for use by the  
rewritable card printer. For example, the rewritable cards  
may have different permanent graphics imprinted on them  
indicating different user affiliations such as affiliations  
15 to different loyalty reward programs. In this way, a user  
may "upgrade" their affiliations by inserting a first style  
of rewritable card into the rewritable card printer and  
exchange it for a second style of rewritable card.

FIG. 11a is side elevation view of a rewritable card  
20 printer in accordance with an exemplary embodiment of the  
present invention. The rewritable card printer 110 includes  
a print module 702 and one or more card magazines 704d and  
704e mechanically coupled to a base 800. The rewritable  
card printer includes a front bezel 802 through which a  
25 rewritable card may be fed by the print module's print card  
drive 706, either into or out of the rewritable card printer  
as previously described. Card magazine 704d is positioned  
on the base such that the card magazine's magazine card  
drive 710d may feed rewritable cards to and receive  
30 rewritable cards from the print module as previously  
described.

In the side view, an additional position for a card  
magazine is shown as card magazine 704e located beneath card  
magazine 704d. This position may be used to mount a card  
35 magazine as either a previously described primary or  
secondary card magazine. In addition, card magazine 704e  
may be replaced by a larger card storage area for card  
magazine 704d that extends through the base.

1           FIG. 11b is side elevation view of a rewritable card  
charging and retrieval process in accordance with an  
exemplary embodiment of the present invention. The  
rewritable card printer 110 includes a print module 702 and  
5           a card magazine 704 mechanically coupled to a base 800. The  
rewritable card printer includes a front bezel 802 through  
which a rewritable card may be fed by the print module's  
print card drive 706, either into or out of the rewritable  
card printer as previously described. Card magazine 704 is  
10           positioned on the base such that the card magazine's  
magazine card drive 710 may feed rewritable cards to and  
receive rewritable cards from the print module as previously  
described.

          A technician may use an external controller 730  
15           electronically coupled to the rewritable card printer and to  
an external card magazine 1112 removable and mechanically  
coupled to the rewritable card printer to load rewritable  
cards into and retrieve cards, such as escrowed cards, from  
the rewritable card printer. This may be done without  
20           opening a cabinet in a game hosting the rewritable card  
printer. To load cards into the rewritable card printer,  
the technician couples the external controller and external  
card magazine to the rewritable card printer. The  
technician then uses the external controller to send a card  
25           load signal to the rewritable card printer and the external  
card magazine. In response to the card load signal, the  
external card magazine dispenses cards into the rewritable  
card printer print module. In response to the card load  
signal, the print module accepts the dispensed cards and  
30           forwards them to an appropriate internal card magazine in  
the rewritable card printer.

          To retrieve cards from the rewritable card printer, the  
technician couples the external controller and external card  
magazine to the rewritable card printer. In response to the  
35           card retrieval signal, the rewritable card printer retrieves  
cards from the rewritable card printer's one or more  
internal card magazines and dispenses the cards using the  
printer module. In response to the card retrieval signal,

1 the external card magazine receives the dispensed cards from the rewritable card printer and stores them.

Optionally, the external print controller may store the number of rewritable cards loaded into the rewritable card printer, an identification of each of the rewritable cards loaded into the rewritable card printer, and an identifier of the rewritable card printer.

To keep track of the rewritable cards held by the rewritable card printer, the rewritable card printer may receive from the external controller a rewritable card identifier for each card dispensed by the external card magazine. The rewritable card printer may also scan each rewritable card for its identifier as each rewritable card is dispensed into the rewritable card printer.

15 In one rewritable card printer in accordance with an exemplary embodiment of the present invention, the rewritable card printer's printer controller contains all of the program instructions necessary to perform card loading and retrieval operations. In this embodiment, the external card magazine couples electronically with the rewritable card printer's printer controller and the rewritable card printer's printer controller commands the external card magazine to dispense and receive cards. The external controller may also communicate directly to the host game 25 106 or the system host 102.

An external controller may be implemented in a variety of different external devices. For example, the external controller may be a purpose-built controller. Other external controllers may be implemented in a programmable device such a Personal Digital Assistant (PDA) or a portable or "laptop" computer.

FIG. 11c is a side elevation view of a rewritable card printer with a card magazine having two independent magazine card drives in accordance with an exemplary embodiment of the present invention. The rewritable card printer 110 includes a print module 702 and a card magazine 1100 mechanically coupled to a base 800. The rewritable card printer includes a front bezel 802 through which a



1       rewritable card may be fed by the print module's print card  
drive 706, either into or out of the rewritable card printer  
as previously described.

5       Card magazine 1100 includes a first magazine card drive  
1102 and a second magazine card drive 1104. The card is  
positioned on the base such that the card magazine's  
magazine card drives may feed rewritable cards, 114a and  
114b, to and receive rewritable cards from the print module  
using the same card storage area 1106. The first magazine  
10       card drive receives and dispenses cards from a first end  
1108 of the card storage location. The second card magazine  
drive receives and dispenses cards from a second end 1110 of  
the card storage location. In this way, the card magazine  
may be used as a LIFO card storage device or a FIFO card  
15       storage device depending on whether two drives or one drive  
are employed. In addition, the magazine card drives may be  
used to store cards in the card storage location at an  
angle, such as at a 90 degree angle, relative to the  
orientation of the card while the card is being operated on  
20       by the printer module.

FIG. 11d is a side elevation view of a card magazine  
having a plurality of card storage locations serviced by a  
single card magazine drive. A card magazine 1112 may have a  
plurality of card storage locations, such as card storage  
25       locations 1114 and 1116. A single magazine card drive 1118  
may service both card storage locations. In this way, a  
single card magazine may be used to shuffle cards to locate  
specific cards or rotate cards in storage to even out erase  
and write cycles performed on the cards.

30       FIG. 11e is side elevation view of a rewritable card  
printer slidably coupled to a gaming machine in accordance  
with an exemplary embodiment of the present invention. The  
rewritable card printer 110 includes a print module 702 and  
a card magazine 704 mechanically coupled to a printer base  
35       1150. The rewritable card printer includes a front bezel  
802 through which a rewritable card may be fed by the print  
module's print card drive 706, either into or out of the  
rewritable card printer as previously described. Card

1 magazine 704 is positioned on the base such that the card  
magazine's magazine card drive 710 may feed rewritable cards  
114 to and receive rewritable cards from the print module as  
previously described.

5 The printer base is further slidably coupled to a base  
plate 1152 that is fixedly coupled to a portion 1154 of a  
gaming machine hosting the printer. The rewritable card  
printer may be accessed while still in the gaming machine by  
sliding the rewritable card printer out of the gaming  
10 machine. The card magazine may be mechanically coupled to  
the printer base by a quick disconnect 1156 so that the card  
magazine may be easily removed. To facilitate easy removal,  
the card magazine may be coupled to the printer controller  
606 (of FIG. 7a) by a quick disconnect electrical connector  
15 1157 that allows the card magazine to be installed, removed,  
or exchanged without removing the power to the gaming  
machine or rewritable card printer.

The print module may be mechanically coupled to the  
printer base by a quick disconnect 1158 so that the print  
20 module may be easily removed. To further facilitate easy  
removal, the print magazine may be coupled to the printer  
controller 606 (of FIG. 7a) by a quick disconnect electrical  
connector 1160 that allows the print module to be installed,  
removed, or exchanged without removing the power to the  
25 gaming machine or rewritable card printer.

In one embodiment of a card magazine, the card magazine  
is slidably coupled to the printer base separately from the  
print module. In this embodiment, the card magazine may  
be accessed by sliding the card magazine past the print module  
30 so that the card magazine may be separately serviced.

FIG. 12 is a process flow diagram of a rewritable card  
printing process in accordance with an exemplary embodiment  
of the present invention. During a printing process 1200, a  
rewritable card printer receives (1202) rewritable card  
35 information such as cash-out value or images to print onto  
the rewritable card. The rewritable card printer reads  
(1204) any security feature embedded in the rewritable card,  
storing the resultant security signature signal in temporary

1       memory.     The rewritable card printer generates (1206)  
indicia to print onto the rewritable card using the  
rewritable card values or images.     Additionally, the  
rewritable card printer may incorporate all or a portion of  
5       security signature signal into the printed indicia as either  
a clearly readable value or an encoded value.     The  
rewritable card printer then optionally erases (1208) the  
rewritable card and then prints the indicia onto the  
rewritable card prior to dispensing the rewritable card.  
10       The rewritable card printer may then transmit (1210) the  
security signature signal, either as an encoded value or as  
a clearly readable value, to a game host or cashless enabled  
system host.

FIG. 13 is a process flow diagram of a card escrowing  
15       process used by a rewritable card printer in accordance with  
an exemplary embodiment of the present invention.     In a card  
escrowing process 1300, a rewritable card printer determines  
if a card should be removed from service.     A card may be  
removed from service for a variety of reasons.     Rewritable  
20       cards have a finite number of erase and write cycles and so  
must be removed from service as they age.     A card may become  
damaged so that it is no longer operable within rewritable  
card printer or the rewritable card's security feature is no  
longer readable.     Cards may also have physical features such  
25       as embossing that may require the card to be handled in a  
special manner.     As the rewritable card printer includes an  
optical scanner and can verify if a card was printed  
properly immediately after printing the card, the rewritable  
card printer may determine that a card was printed in error  
30       and may escrow the card.     In addition, the rewritable card  
printer may receive an identifier for a rewritable card to  
be removed from service.     In which case, the security  
feature in the rewritable card may be readable but  
correspond to a card to be removed from service.     Another  
35       reason a card may be escrowed is that the user is exchanging  
one kind of rewritable card for another kind of rewritable  
card.

Cards may be removed from service by moving the card

1     into an escrow location within the rewritable card printer  
by either a magazine card drive or by a print card drive.  
In the escrow process, the rewritable card determines (1302)  
if a card should be removed from service. If the rewritable  
5     card printer determines that the card should remain in  
service (1304), the rewritable card continues processing  
(1306) the rewritable card. Otherwise, the rewritable card  
printer moves (1306) the rewritable card to an escrow  
location 1307 within the rewritable card printer and obtains  
10    (1308) a replacement card from a card magazine 1310 and  
continues processing (1312) the newly obtained rewritable  
card.

FIG. 14 is a card retrieval process used by a  
rewritable card printer having companion magazines in  
15    accordance with an exemplary embodiment of the present  
invention. As noted previously, a card magazine having a  
single magazine card drive may be considered as being  
similar to a LIFO memory device. As previously noted, a  
rewritable printer controller may store information about  
20    cards stored in the card magazines. This information may  
include where in a card magazine a particular rewritable  
card is stored. In this case, a specific card stored in the  
card magazines may be retrieved using the following process..

In a card retrieval process 1400, a rewritable card  
25    printer receives a request for a specific rewritable card  
from an external host or a game controller. The rewritable  
card printer receives (1402) the request and determines  
(1404) where in the storage areas of the card magazines that  
the specific card is located using previously stored card  
30    information 704. For the number of cards on top of the  
request card, the rewritable card moves (as indicated by  
loop structure 1406, to 1410) all of the cards on top of the  
requested card into a companion card magazine's storage area  
1409. The rewritable card printer then dispenses (1412) the  
35    located card. Optionally, the rewritable card printer may  
replace all of the moved cards from the companion card  
magazine (as indicated by loop structure 1414, 1416, and  
1418).

1           FIG. 15 is a process flow diagram of a card location  
process used by a rewritable card printer having multiple  
card magazines in accordance with an exemplary embodiment of  
the present invention. This card location process, 1500,  
5       may be used when the rewritable card printer does not keep  
an accounting of each writeable card stored in the  
rewritable card printer's memory. The rewritable card  
printer receives (1502) an identifier for a card to be  
located. For each rewritable card stored by the rewritable  
10       card printer in a card magazine (as indicated by the loop  
structure 1504 to 1514), the rewritable card printer moves  
(1506) a rewritable card from a card magazine 1507 into a  
read portion of the print module 702 (of FIG. 7) and reads  
(1508) an identifier, such as a previously described  
15       security feature, from the rewritable card. The rewritable  
card printer then compares (1510) the read identifier to the  
received identifier. If the comparison indicates that the  
requested rewritable card is located, the rewritable card  
printer dispenses (1516) the located card. If the  
20       comparison indicates that the retrieved rewritable card is  
not the requested rewritable card, the rewritable card  
printer moves the card into a companion card magazine's  
storage location 1409 and continues processing rewritable  
card until either the requested card is located or the last  
25       of the stored rewritable cards is retrieved.

          Optionally, the rewritable card printer may put all of  
the moved rewritable cards back into their original  
locations within a card magazine. For each of the moved  
cards (as indicated by the loop structure 1518 to 1522) the  
30       rewritable card printer retrieves (1520) a moved card out of  
the companion storage location and places it back into the  
card magazine 1507.

          FIG. 16 is a process flow diagram of a card replacement  
process in accordance with an exemplary embodiment of the  
35       present invention. A rewritable card printer may include  
two or more card magazines as previously discussed. This  
feature allows a gaming machine to be used for more  
sophisticated transactions than merely accepting wagers,

1 playing games, and printing cash-out cards. Using multiple  
card magazines allows a gaming machine to also function as a  
customer service kiosk for several types of operations  
wherein a player may exchange one type of rewritable card  
5 for another during a transaction. An example of such a  
transaction is when a player wants to join a loyalty  
program.

In a card replacement process 1600, a rewritable card  
printer receives (1602) a card from a user for imprinting.  
10 The rewritable card printer moves (1604) the received card  
into a first card magazine 1606 for storage and possible  
reuse. The rewritable card printer then retrieves (1608) a  
replacement card from a second card magazine 1610. The  
rewritable card printer continues processing (1612) the  
15 replacement card such as by printing on the card as  
previously described. The rewritable card printer dispenses  
(1614) the imprinted replacement card to the user whereby  
the user's original card has been replaced with another type  
of card.

20 Although this invention has been described in certain  
specific embodiments, many additional modifications and  
variations would be apparent to those skilled in the art.  
It is therefore to be understood that this invention may be  
practiced otherwise than as specifically described. Thus,  
25 the present embodiments of the invention should be  
considered in all respects as illustrative and not  
restrictive, the scope of the invention to be determined by  
any claims supported by this application and the claims'  
equivalents rather than the foregoing description.

30 FIG. 17 is a process flow diagram of a programming  
process using a rewritable card in accordance with an  
exemplary embodiment of the present invention. A rewritable  
card printer may use a rewritable card to load programming  
instructions into memory. The rewritable card may include  
35 programming instructions in a magnetic strip readable by the  
rewritable card's magnetic strip read/write head, or  
programming instructions may be included in the printed  
indicia on the card and read by an optical scanning device.

1           In a programming process 1700, a rewritable card  
printer receives (1702) a card and determines (1704) if the  
card includes programming instructions. A rewritable card  
5           printer may make the determination by either scanning the  
card and parsing the information found on the card or may be  
signaled by an external device that the inserted card  
includes programming instructions. If the card does have  
programming instructions, the rewritable card printer reads  
10           (1706) the programming instructions and stores the  
programming instructions 113 in the rewritable card  
printer's memory 722. After reading the card, the  
rewritable card printer dispenses the card 724. In addition  
to reading rewritable cards to obtain additional programming  
instructions, the rewritable card printer may receive  
15           programming instructions from an external device, such as  
external controller 730 (of FIG. 7a).

FIG. 18 is a process flow diagram of a card information  
storage process in accordance with an exemplary embodiment  
of the present invention. A rewritable card printer  
20           receives (1802) a card 1804 for storage into a card  
magazine. The rewritable card printer reads (1806) card  
information from the card. The card information may include  
the number of erase/write cycles that the card has gone  
through and the unique signature of the card. The  
25           rewritable card printer stores (1808) the card information  
in static memory 1810. The static memory may be on the card  
itself, in a card magazine, or in a static memory location  
in the printer controller. Once the card information has  
been stored, the writable card printer erases (1812) the  
30           card and stores (1814) the erased card in a card magazine  
1816.

FIG. 19 is a process flow diagram of a card information  
retrieval process in accordance with an exemplary embodiment  
of the present invention. A card retrieval process 1900 is  
35           used by a rewritable card printer to initiate writing to an  
erased card. The card's information, including information  
about how many read/write cycles the card has gone through,  
is stored in static memory 1810 as previously described.

1 This enables a rewritable card printer to safely store  
rewritable cards in an erased mode and still track card  
usage in order to determine when a card should be removed  
from service.

5 The rewritable card printer retrieves (1902) a card  
from a card magazine 1816. The rewritable card printer  
reads (1904) the cards signature and uses (1906) the card's  
signature to retrieve card information from the static  
memory. The rewritable card printer then continues (1908)  
10 processing the rewritable card using the retrieved card  
information. This may include incrementing the number of  
erase/write cycles that the card has gone through onto the  
card before dispensing the card. This processing may also  
include removing the card from service.

15 FIG. 20 is a stored card status printing process in  
accordance with an exemplary embodiment of the present  
invention. A rewritable card printer uses a stored card  
status printing process 2000 to report on a rewritable card  
the status of the rewritable card printer, game host, and  
20 rewritable cards stored by the rewritable card printer. The  
rewritable card printer receives 2002 a request for printing  
a status card. The in response to the request, the  
rewritable card printer retrieves (2004) a card from the  
card magazine 1816. The rewritable card printer retrieves  
25 (2006) card information stored in static memory 1810 about  
the cards stored by the rewritable card printer. The  
rewritable card printer then uses the card information to  
generate printable indicia for printing (2008) on the card  
and prints the indicia on the card before dispensing it.

30 FIG. 21 is a side elevation view of a rewritable card  
printer, a card magazine and a destroyed card repository in  
accordance with an exemplary embodiment of the present  
invention. A rewritable card printer 110 includes a print  
module 702 and one or more card magazines, such as card  
35 magazine 704, coupled to a base 800. In this embodiment,  
the card magazine may send a destroyed or otherwise  
incapacitated rewritable card 114 to a destroyed card  
repository 2100. The card magazine further includes a



1 device 2102 used to destroy a rewritable card on command.  
Once the card is destroyed, the remnants of the destroyed  
card are fed into the destroyed card repository by the card  
magazine. The card remnants remain in the destroyed card  
5 repository until an attendant removes the card remnants.  
The repository may be coupled to the rewritable card printer  
and card magazine by the base. In another embodiment, the  
repository is similar to a trash bin and is placed in a  
position to catch card remnants as the card remnants are  
10 ejected from the card magazine. For example, the card  
repository may be a bin located beneath the printer in a  
body of a gaming machine.

In one embodiment of a card magazine, the card-  
destroying device is a mechanical device that cuts or shears  
15 a rewritable card or shreds the rewritable card into a  
plurality of remnants. For example, the card-destroying  
device may include a cutting device such as one or more  
cutting wheels or shears that engage a rewritable card as  
the rewritable card passes through the card magazine. The  
20 cutting device may cut completely through the card and/or  
magnetic strip or may simply score the card. If the cutting  
device cuts through the card, a plurality of card remnants  
are generated and ejected by the card magazine into the  
repository. If the card is scored, then only a single card  
25 remnant may be generated during the destruction process.

In another embodiment of a card magazine, the card-  
destroying device creases or folds the card in order to  
destroy the card. In this embodiment, the card remains  
intact but may no longer be inserted into a card reader as  
30 the card is deformed.

In another embodiment of a print module, the print  
module includes a card-destroying device 2104. The type of  
card-destroying device is dependent on the type of card the  
print module is designed to work with. For example, the  
35 card-destroying device may be a mechanical device similar  
mechanical device used by a card magazine as previously  
described.

In another embodiment of a rewritable card printer in

1      accordance with an exemplary embodiment of the present  
invention, an erase head 602 (of FIG. 7a) may be employed as  
a card-destroying device. In this embodiment, the erase  
head is heated to a temperature high enough to erase any  
5      indicia from the card and to permanently destroy the ability  
of the card to accept further write operations. An erase  
head used as a card-destroying device may be located in  
either the print module or the card magazine.

10      In another embodiment of a rewritable card printer in  
accordance with an exemplary embodiment of the present  
invention, an electromagnetic read/write head 607 (of FIG.  
7a) is used to erase or degauss a magnetic strip type  
rewritable card. In this embodiment, a magnetic strip on  
the rewritable card is erased using the read/write head in  
15      order to invalidate the rewritable card. An electromagnetic  
read/write head used as a card-destroying device may be  
located in either the print module or the card magazine.

FIG. 22 is a process flow diagram of a card  
destruction process in accordance with an exemplary  
20      embodiment of the present invention. The process starts  
(2200) by receiving (2202) a rewritable card. The process  
also receives (2204) card information relating to whether or  
not the card should be destroyed. The card information may  
come from an external device as a command 2206 to destroy an  
25      identified card. For example, a player tracking system may  
determine that a rewritable card may be being used in a  
fraudulent manner. In this case, the player tracking system  
may request that the card be destroyed if a printer detects  
the card being used. The card information may also be in  
30      the form of sensor data 2208 collected by a print module or  
a card magazine from a card. For example, the print module  
may have attempted to write to the card and been unable to  
verify the write operation in which case the card may need  
to be destroyed to remove the card from circulation.

35      Using the card information, the process determines  
(2210) if the card should be destroyed. If so, the process  
destroys (2212) the card and places any card remnants into a  
card repository 2100. Additionally, the process stores a

1 card identifier for the destroyed card in a destroyed card  
identifier datastore (2214). The destroyed card identifier  
datastore may then be queried by other processes to  
determine what cards may have been destroyed. The destroyed  
5 card identifier may then be reported to an external system  
such as a player card tracking system for further  
processing. If the card does not need to be destroyed, the  
process stops (2216).

10 Although this invention has been described in certain  
specific embodiments, many additional modifications and  
variations would be apparent to those skilled in the art.  
It is therefore to be understood that this invention may be  
practiced otherwise than as specifically described. Thus,  
the present embodiments of the invention should be  
15 considered in all respects as illustrative and not  
restrictive, the scope of the invention to be determined by  
any claims supported by this application and the claims'  
equivalents rather than the foregoing description.

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1 WHAT IS CLAIMED IS:

1. A rewritable card printer, comprising:

a card magazine coupled to a print module, the  
card magazine including a card-destroying device;

5 a printer controller electronically coupled to the  
print module and the card magazine, the printer  
controller comprising:

a processor; and

10 a memory coupled to the processor, the memory  
having program instructions executable by the  
processor stored therein, the program instructions  
comprising:

receiving a card; and

15 destroying the card using the card-  
destroying device.

2. The rewritable card printer of claim 1, wherein the  
card-destroying device is a mechanical device and destroying  
the card further comprises cutting the card into a plurality  
20 of remnants.

3. The rewritable card printer of claim 1, wherein the  
card-destroying device is a thermal erase head, the card  
includes a rewritable thermal film, and destroying the card  
25 comprises heating the card to a temperature that destroys  
the rewritable thermal film.

4. The rewritable card printer of claim 1, wherein the  
card-destroying device is an electromagnetic erase head, the  
30 card includes a rewritable magnetic strip, and destroying  
the card comprises degaussing the magnetic strip.

5. The rewritable card printer of claim 1, wherein the  
program instructions further comprise:

35 reading card information from the card; and

determining that the card should be destroyed  
using the card information.

1       6. The rewritable card printer of claim 5, wherein the  
program instructions further comprise:

                  receiving a card identifier; and  
                  determining that the card should be destroyed  
5               using the card information and the card identifier.

7. The rewritable card printer of claim 1, wherein the  
card-destroying device is a mechanical device and destroying  
the card further comprises deforming the card.

10

8. A rewritable card printer, comprising:

                  a print module including a card-destroying device;  
                  a printer controller electronically coupled to the  
print module, the printer controller comprising:

15

                  a processor; and

                  a memory coupled to the processor, the memory  
having program instructions executable by the  
processor stored therein, the program instructions  
comprising:

20

                  receiving a card; and

                  destroying the card using the card-  
destroying device.

9. The rewritable card printer of claim 8, wherein the  
25       card-destroying device is a mechanical device and destroying  
the card further comprises cutting the card into a plurality  
of remnants.

10. The rewritable card printer of claim 8, wherein the  
30       card-destroying device is a thermal erase head, the card  
includes a rewritable thermal film, and destroying the card  
comprises heating the card to a temperature that destroys  
the rewritable thermal film.

11. The rewritable card printer of claim 8, wherein the  
35       program instructions further comprise:

                  reading card information from the card; and  
                  determining that the card should be destroyed

1           using the card information.

12. The rewritable card printer of claim 11, wherein the program instructions further comprise:

5           receiving a card identifier; and  
          determining that the card should be destroyed using the card information and the card identifier.

13. The rewritable card printer of claim 8, wherein the card-destroying device is a mechanical device and destroying the card further comprises deforming the card.

14. A rewritable card printer, comprising:  
          card printing means including a card-destroying  
15       device;  
          card printer controller configured to:  
              receive a card; and  
              destroy the card using the card-destroying device.

20  
15. The rewritable card printer of claim 8, wherein the card printer controller is further configured to:  
          read card information from the card; and  
          determine that the card should be destroyed using  
25       the card information.

16. The rewritable card printer of claim 11, wherein the card printer controller is further configured to:  
          receive a card identifier; and  
30       determine that the card should be destroyed using the card information and the card identifier.

35

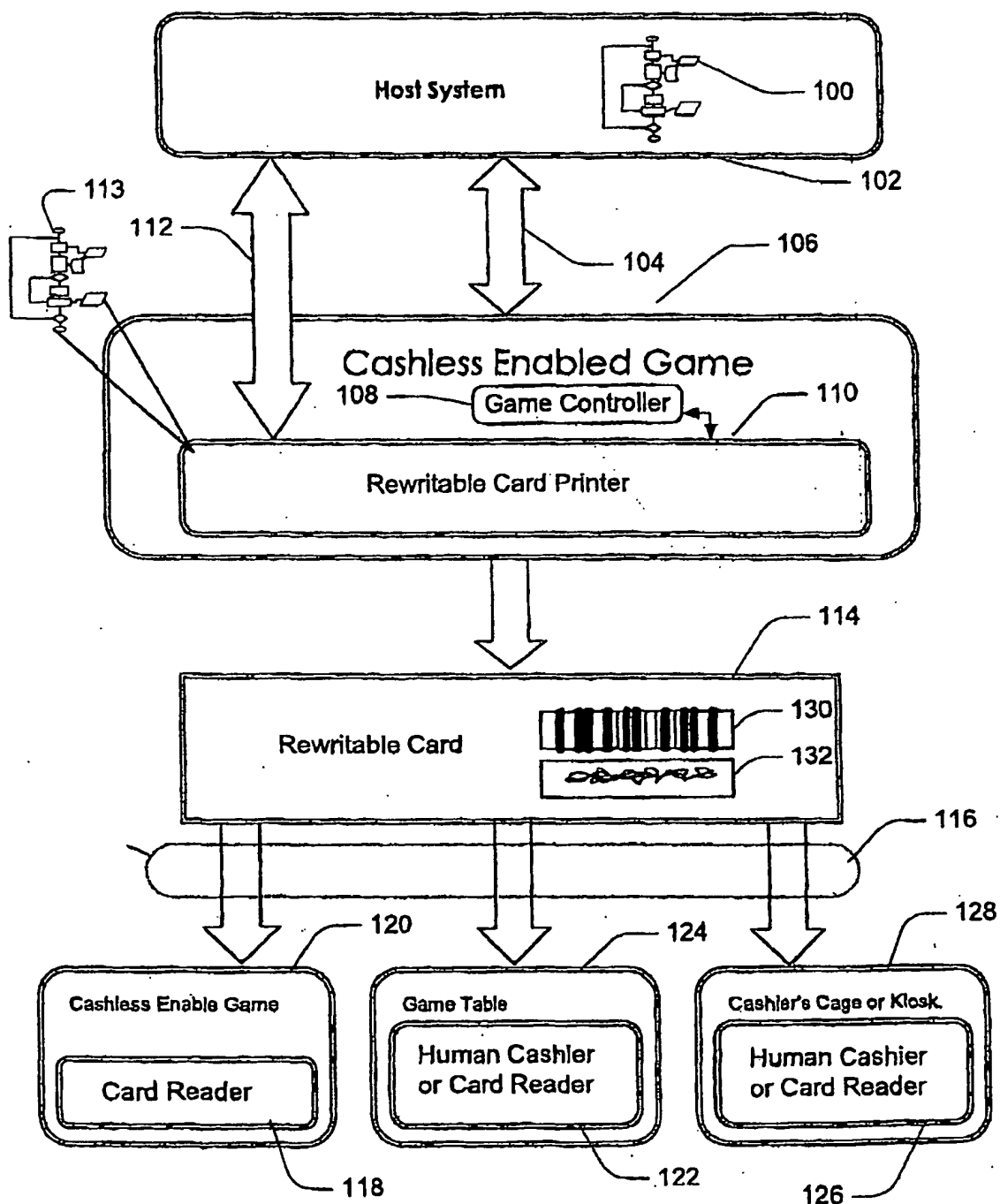


FIG. 1



FIG. 2a

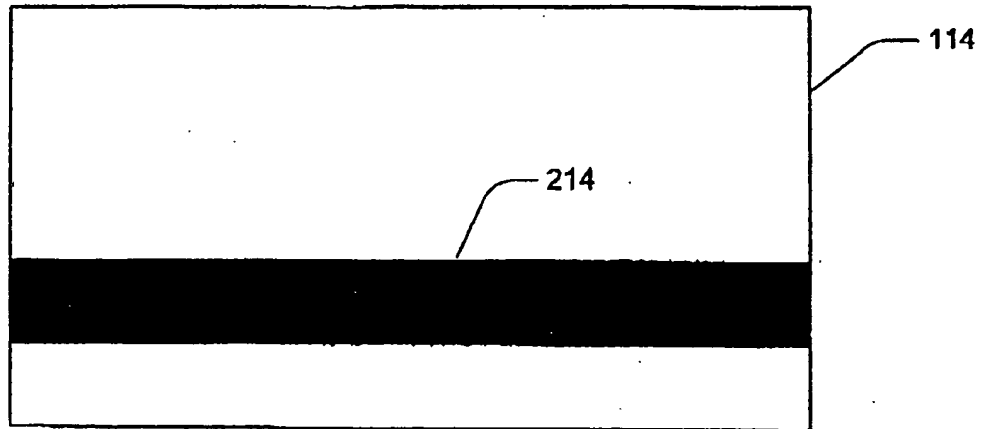


FIG. 2b

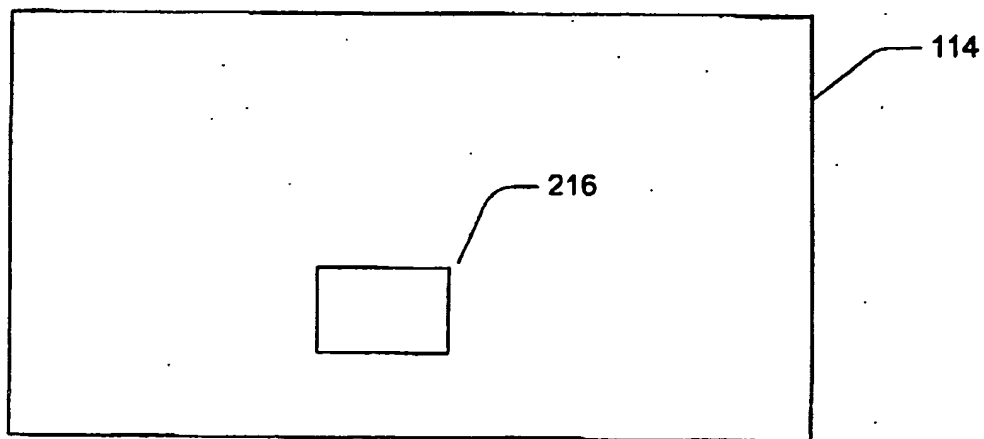
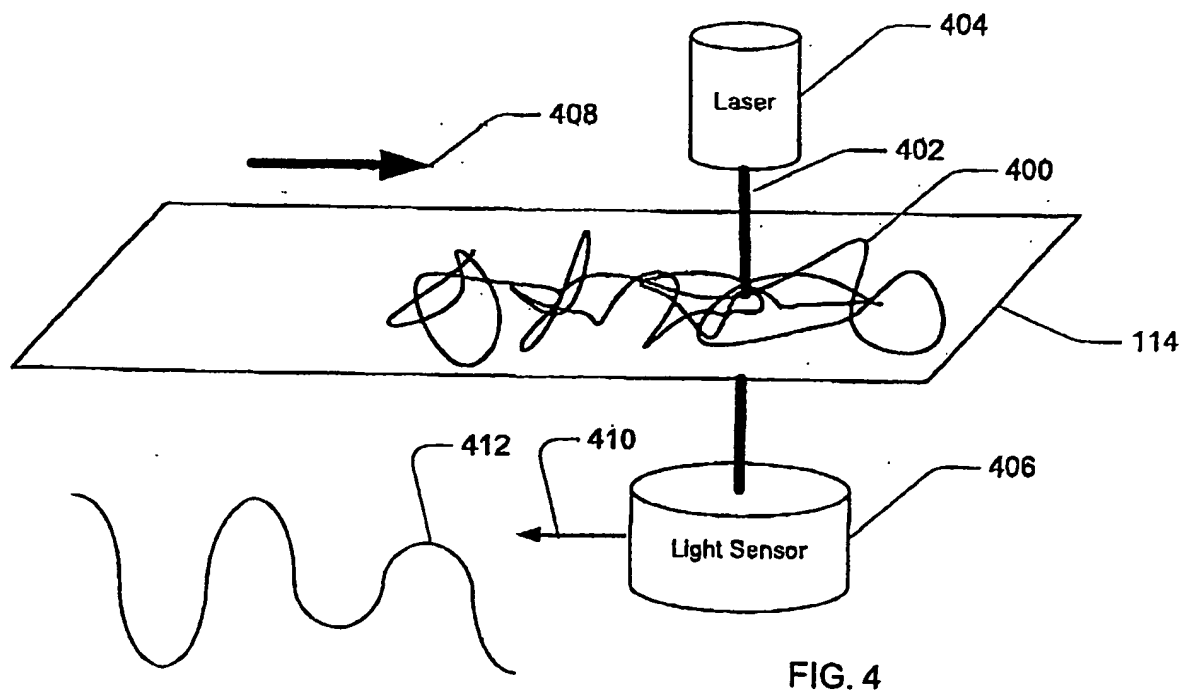
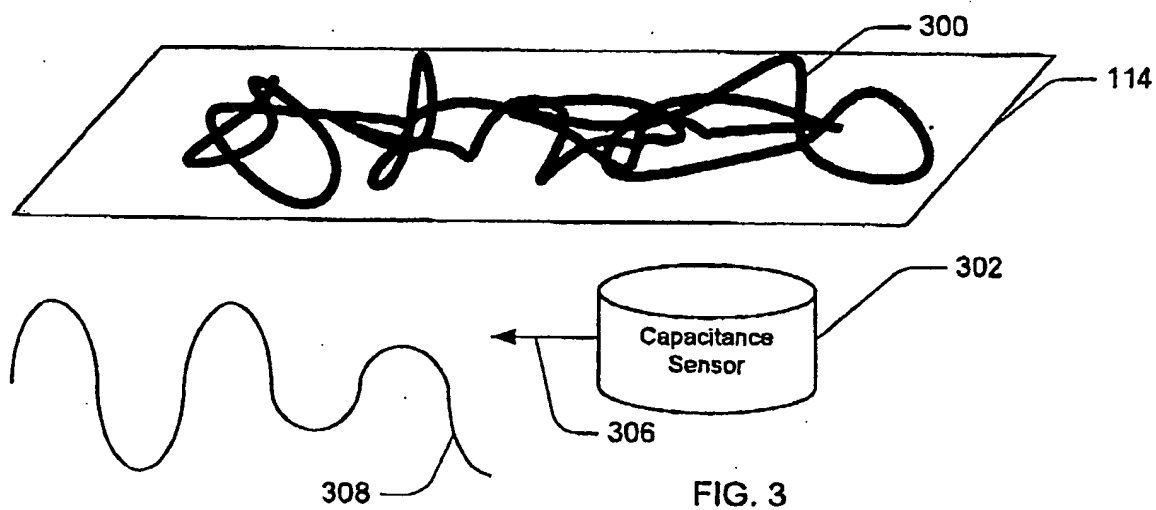


FIG. 2c





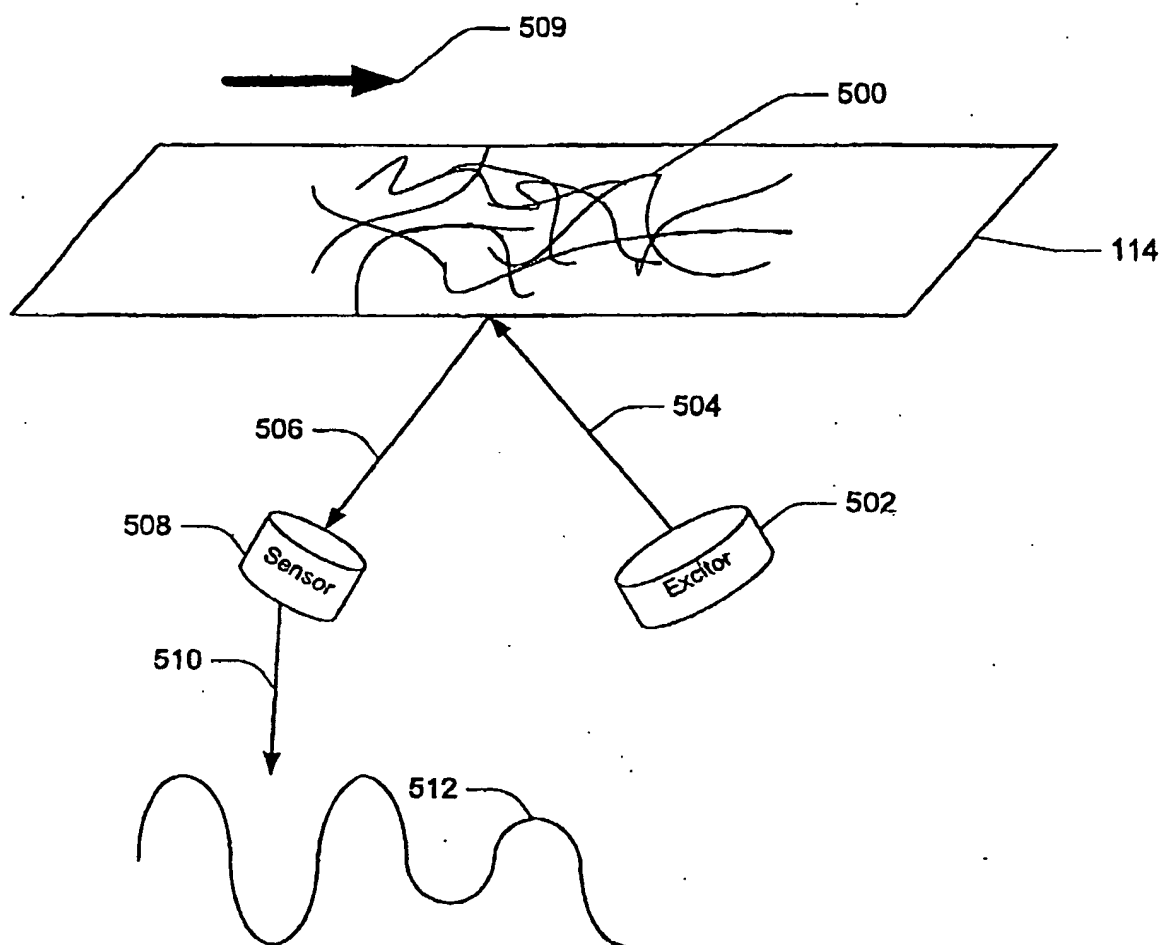


FIG. 5

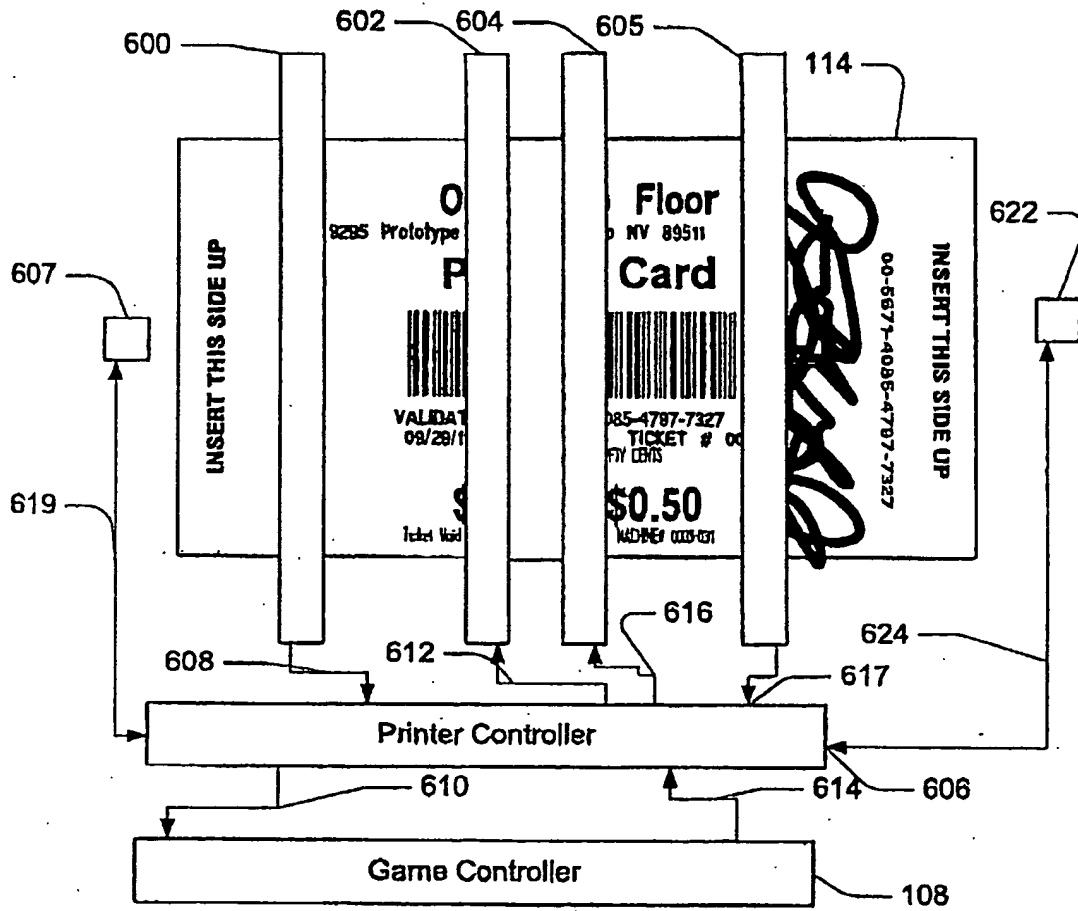


FIG. 6

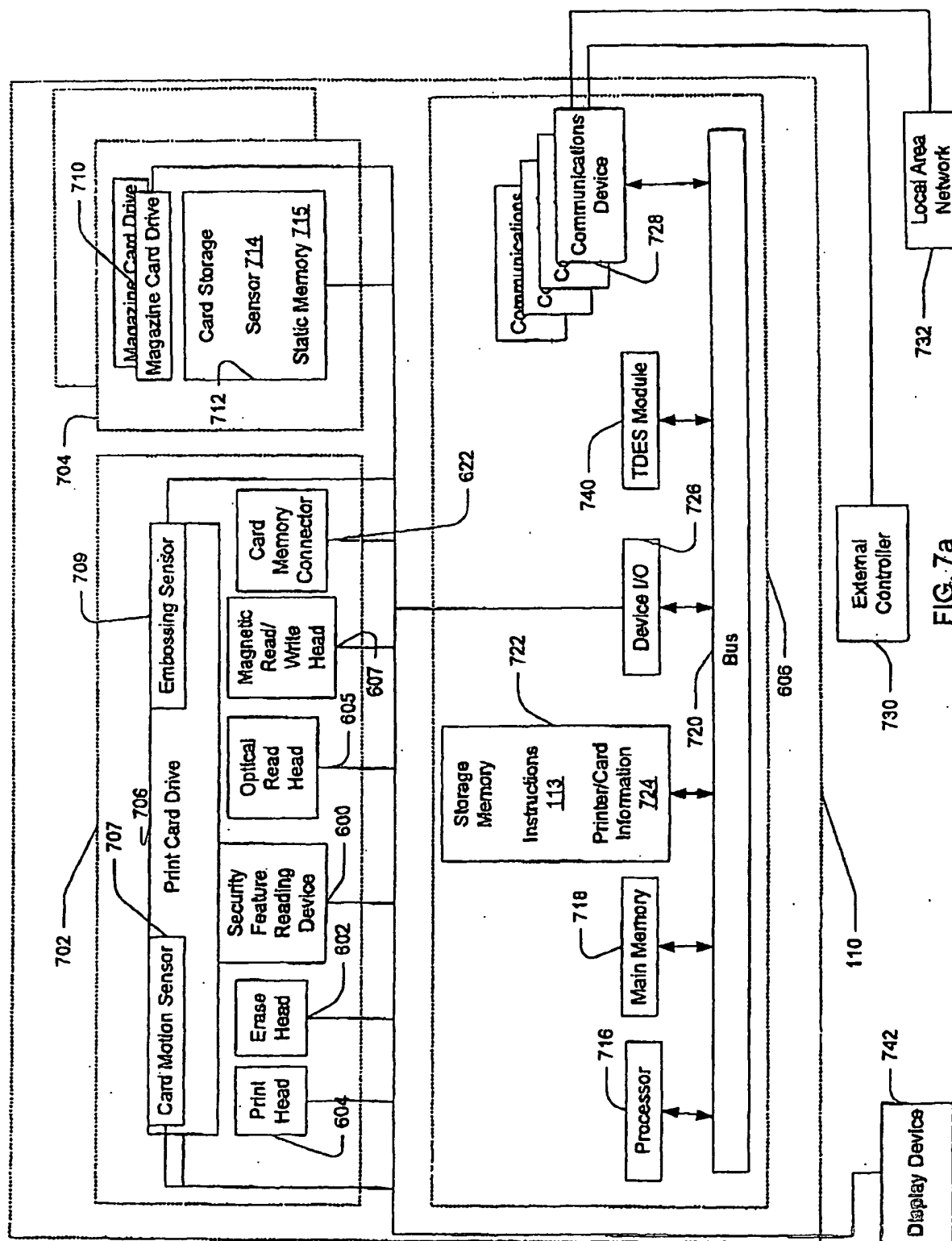


FIG. 7a

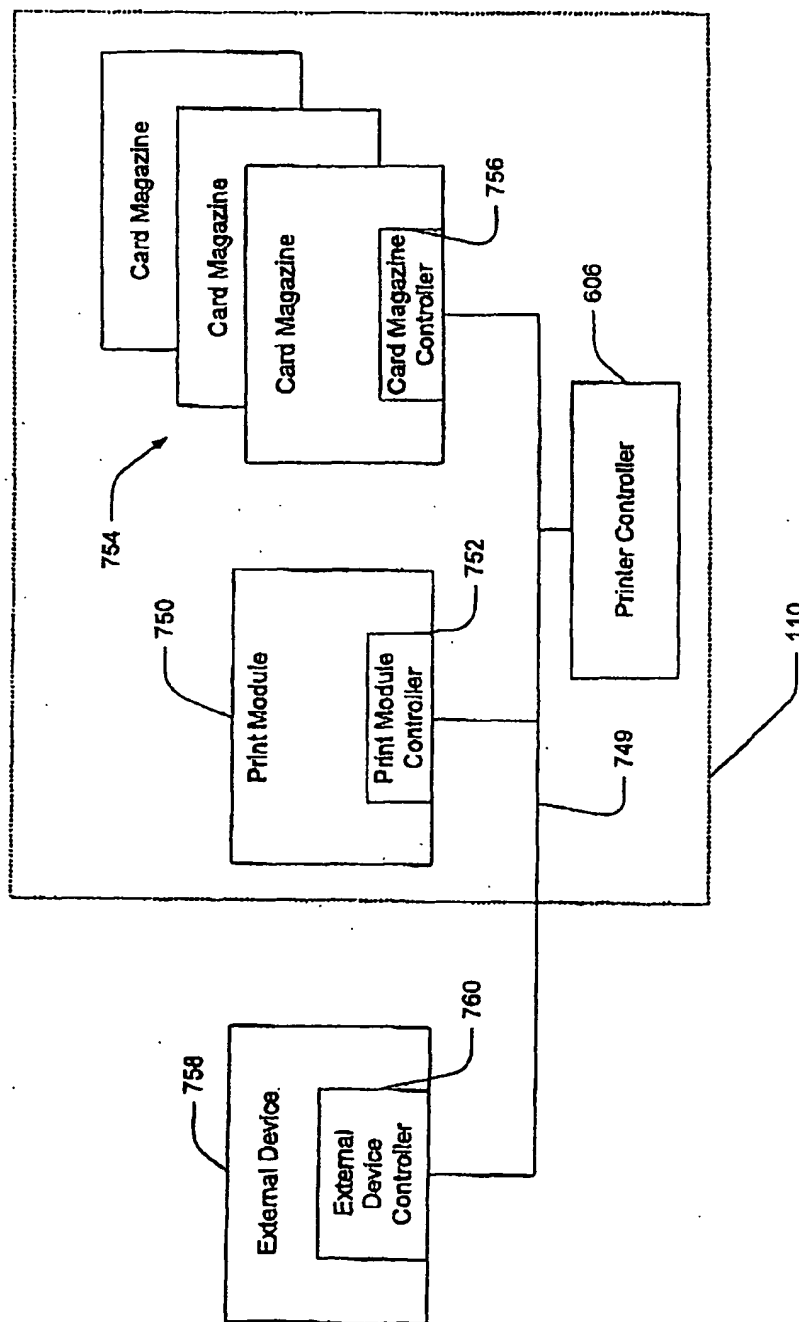
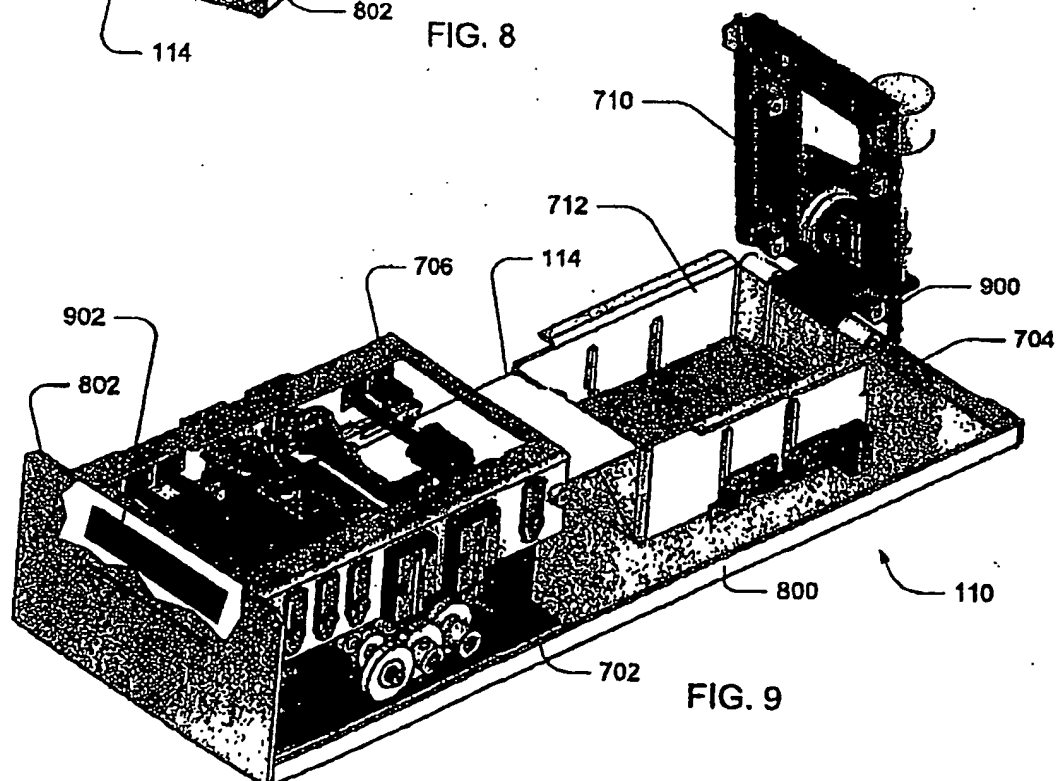
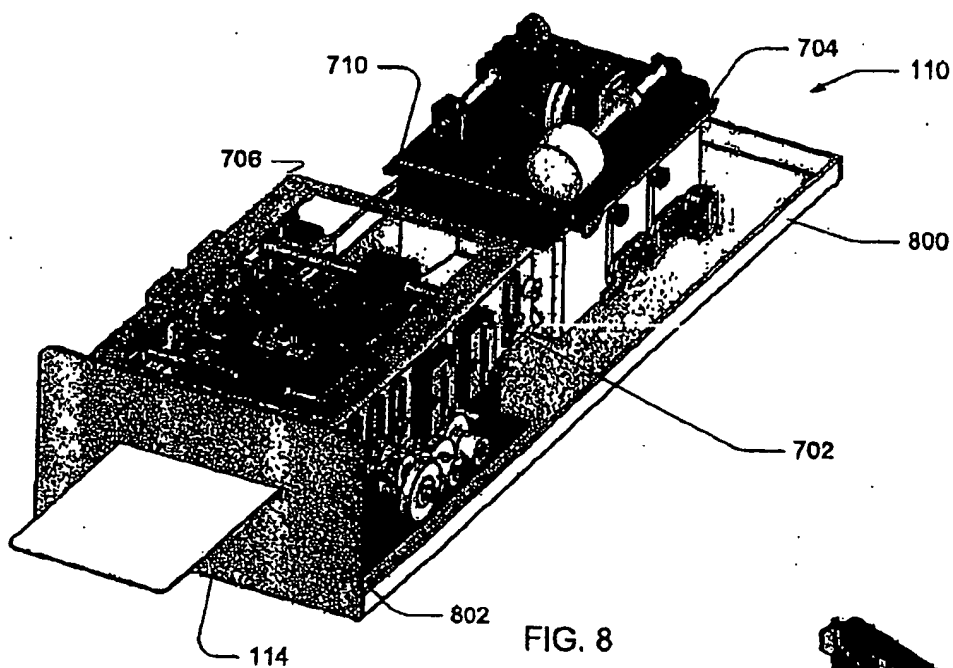
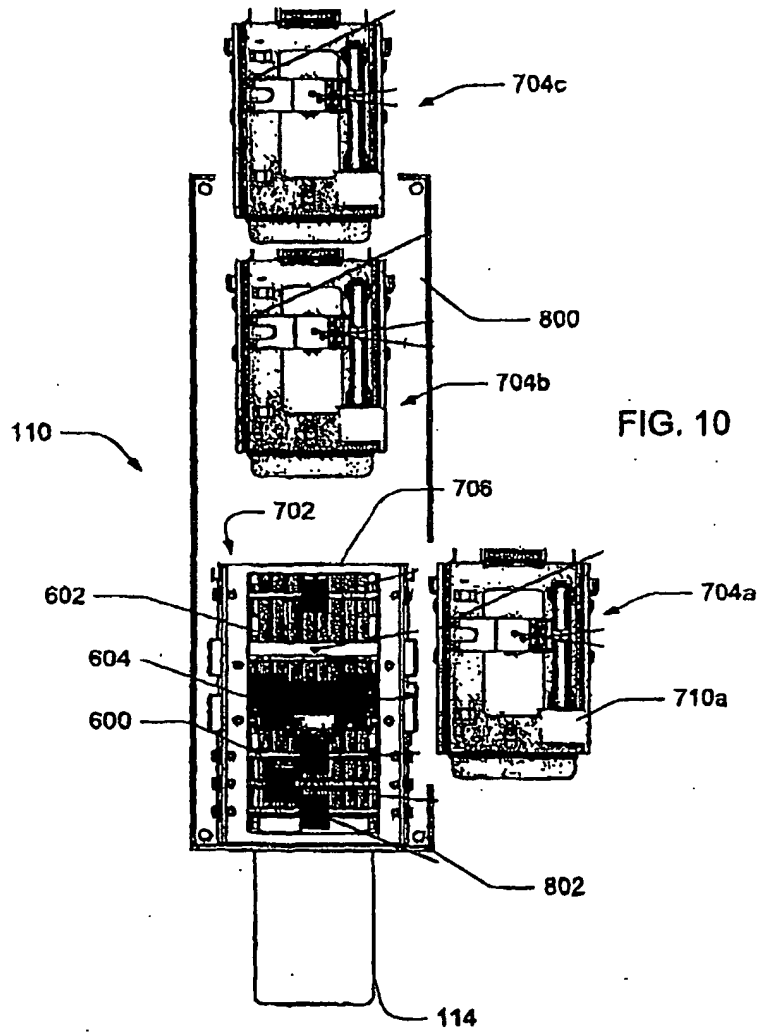
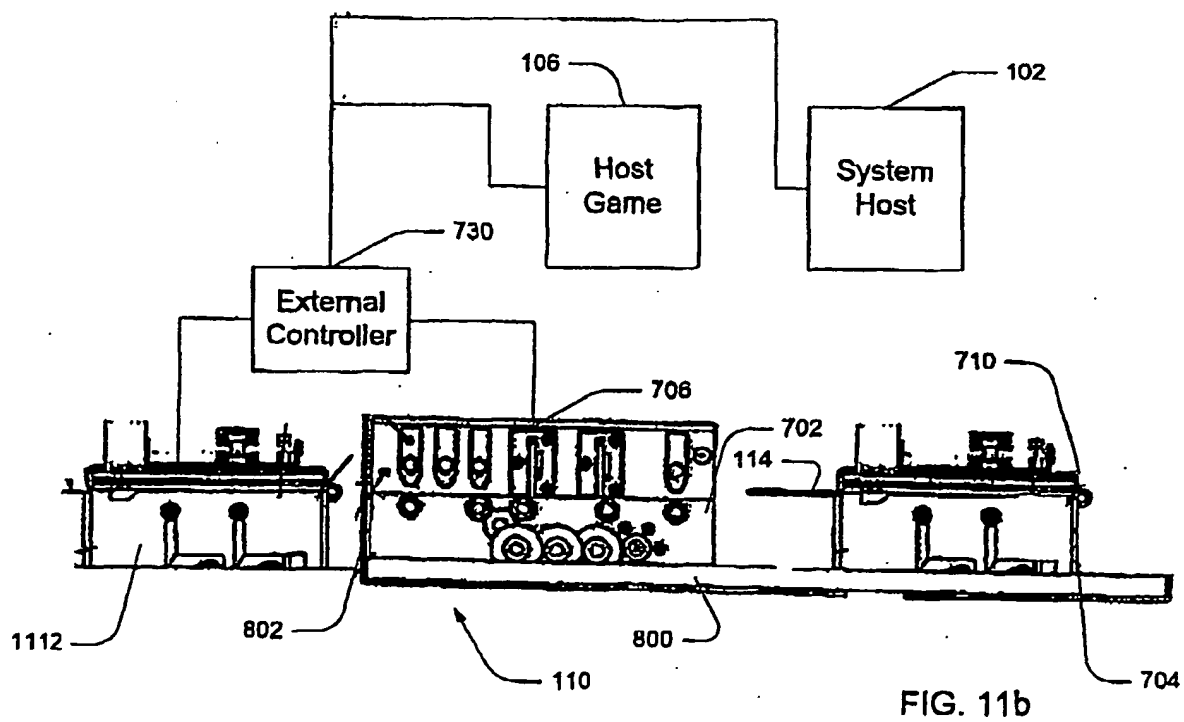
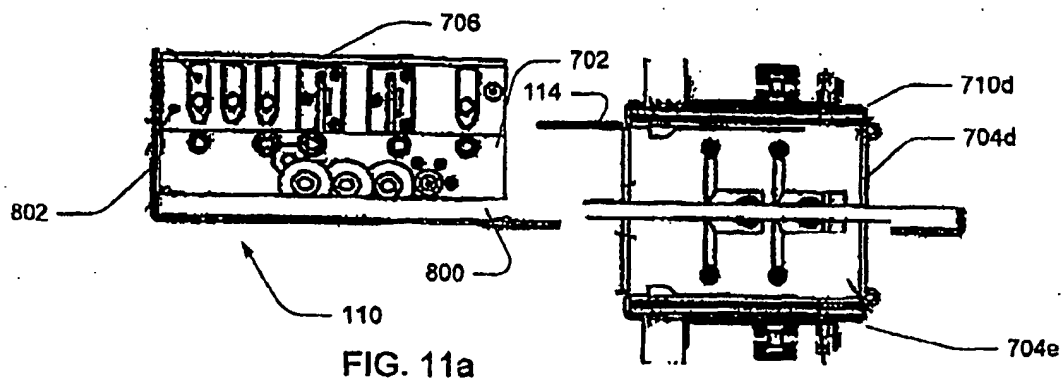


FIG. 7b









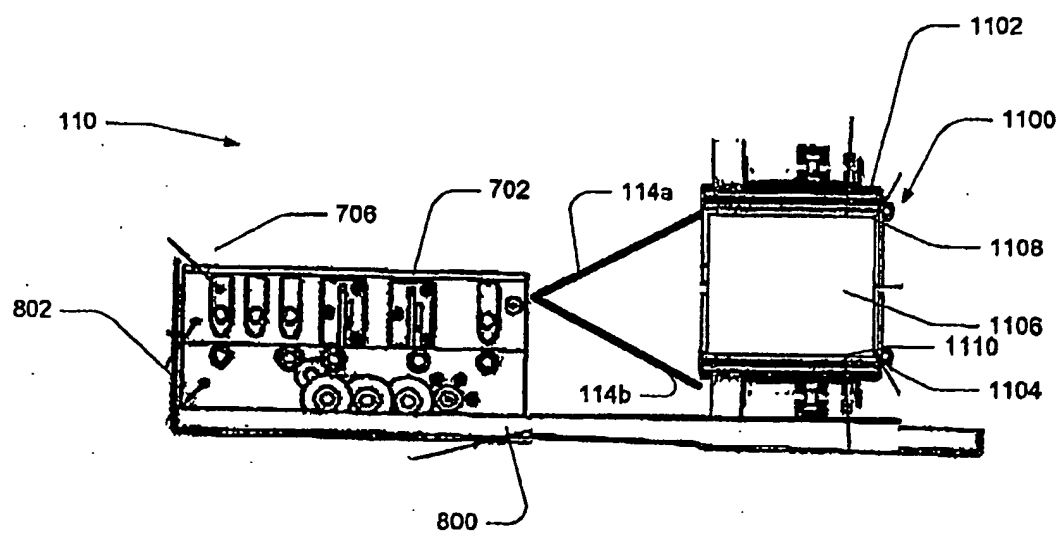


FIG. 11c

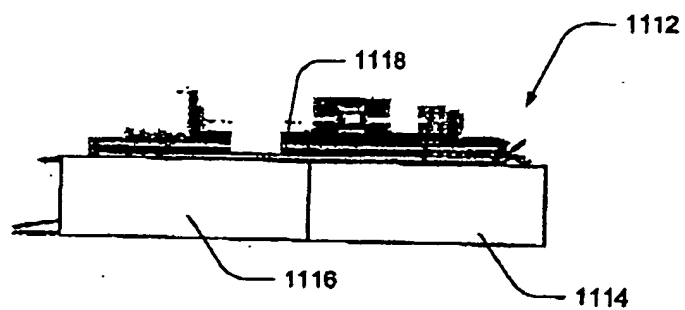


FIG. 11d

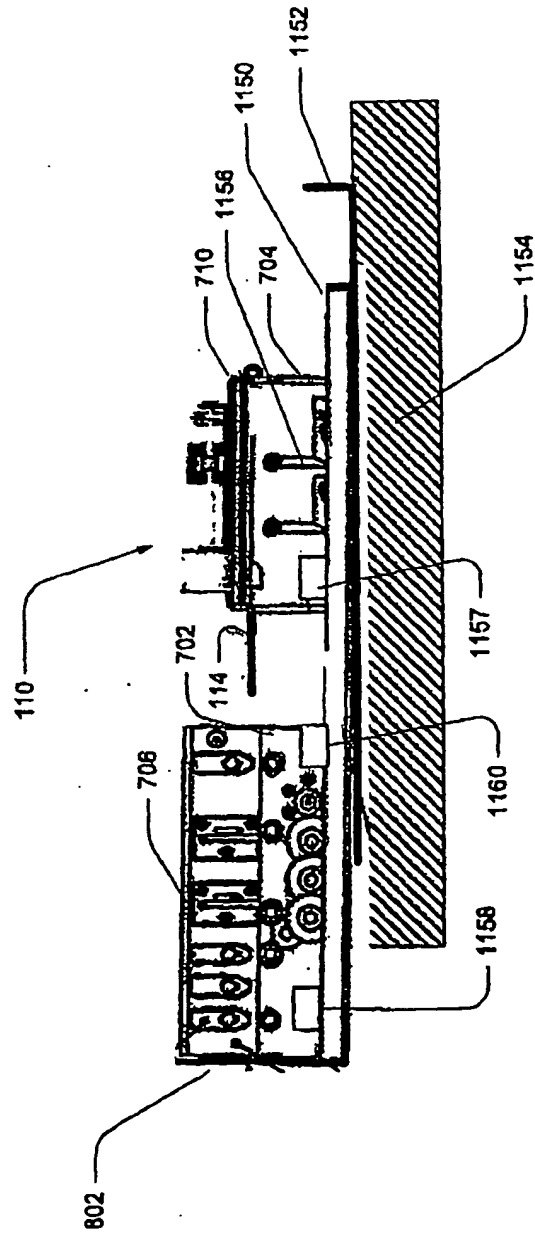


FIG. 11e

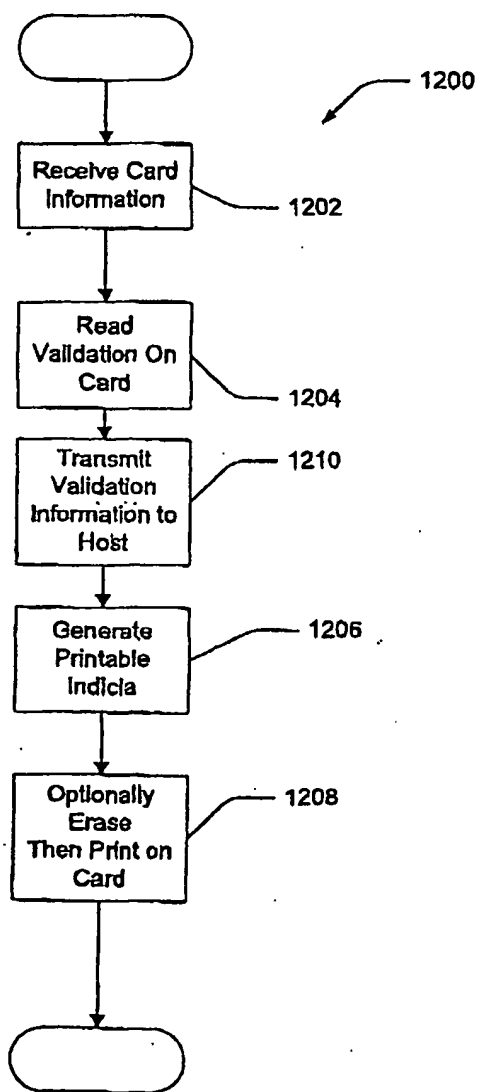


FIG. 12

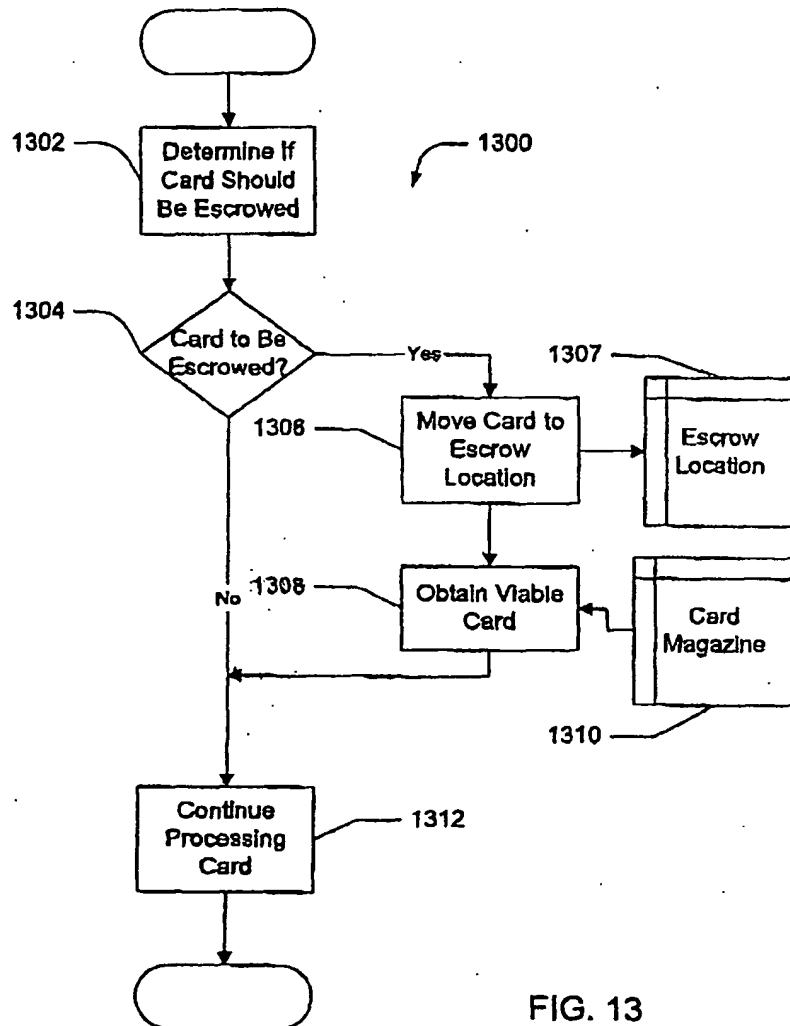
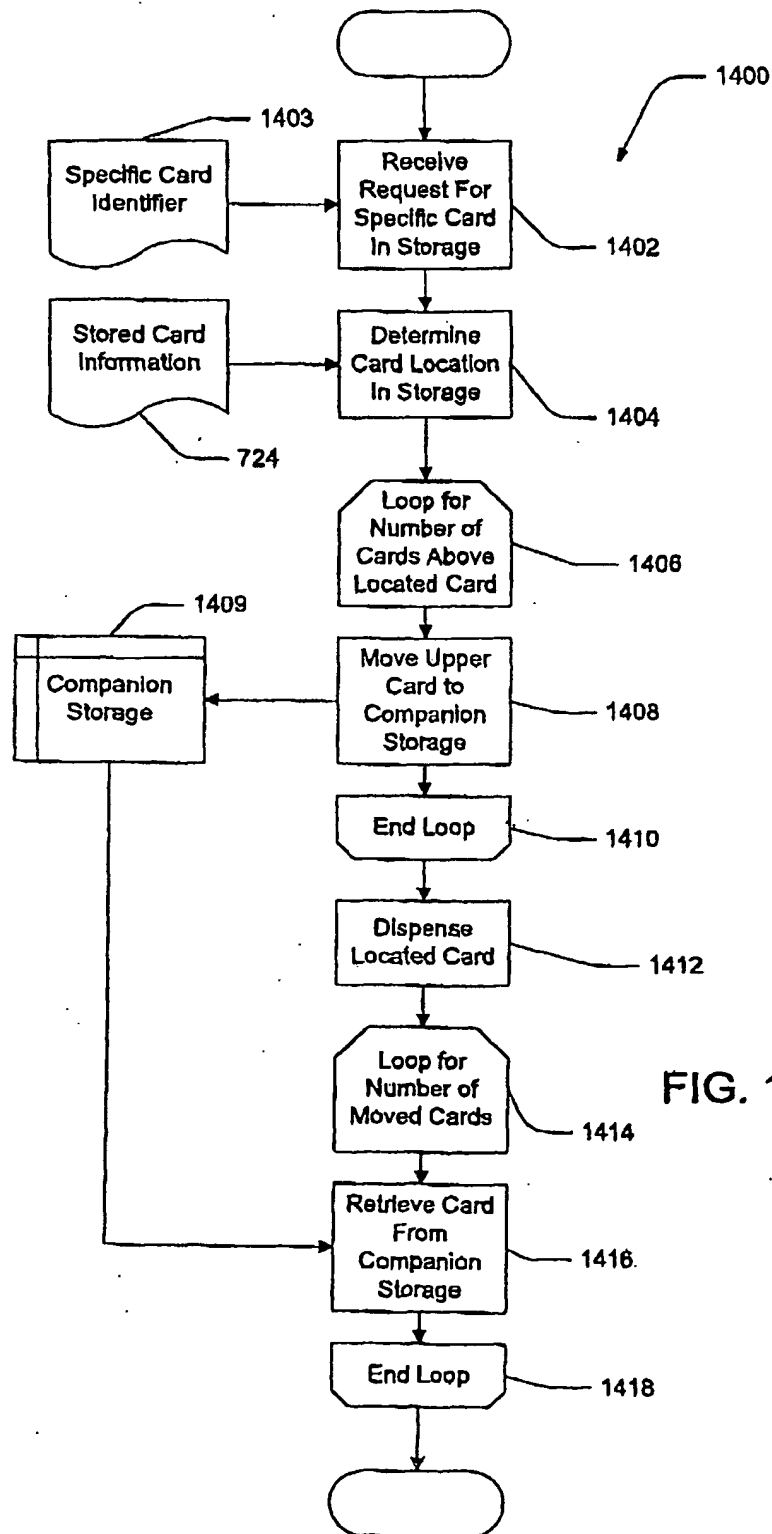
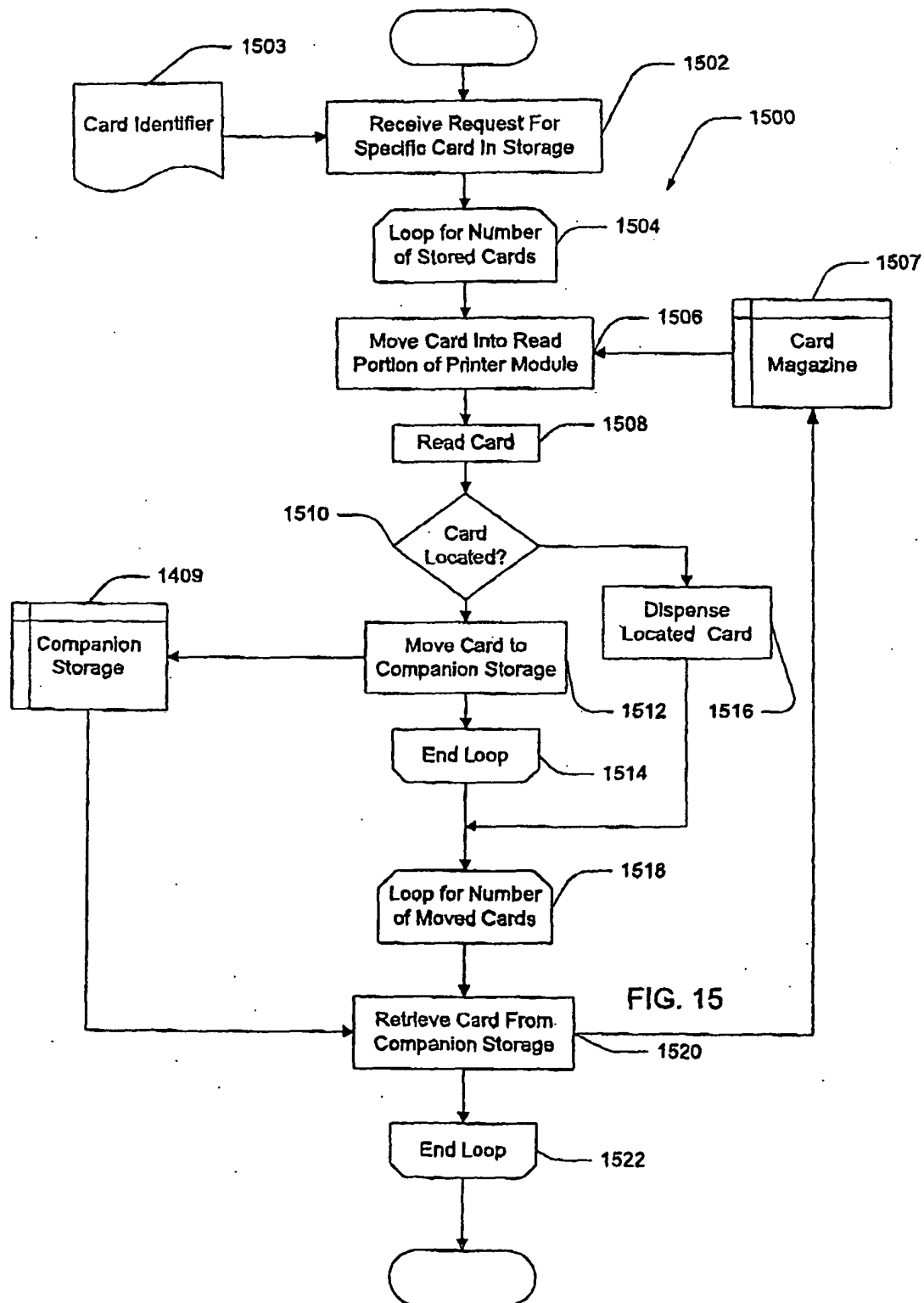


FIG. 13





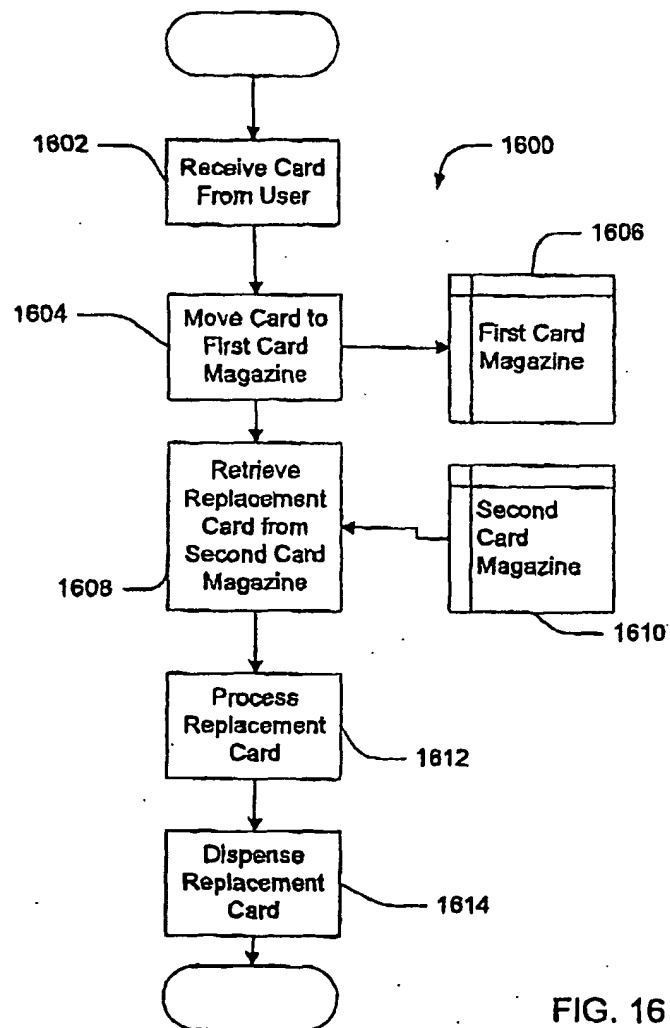


FIG. 16

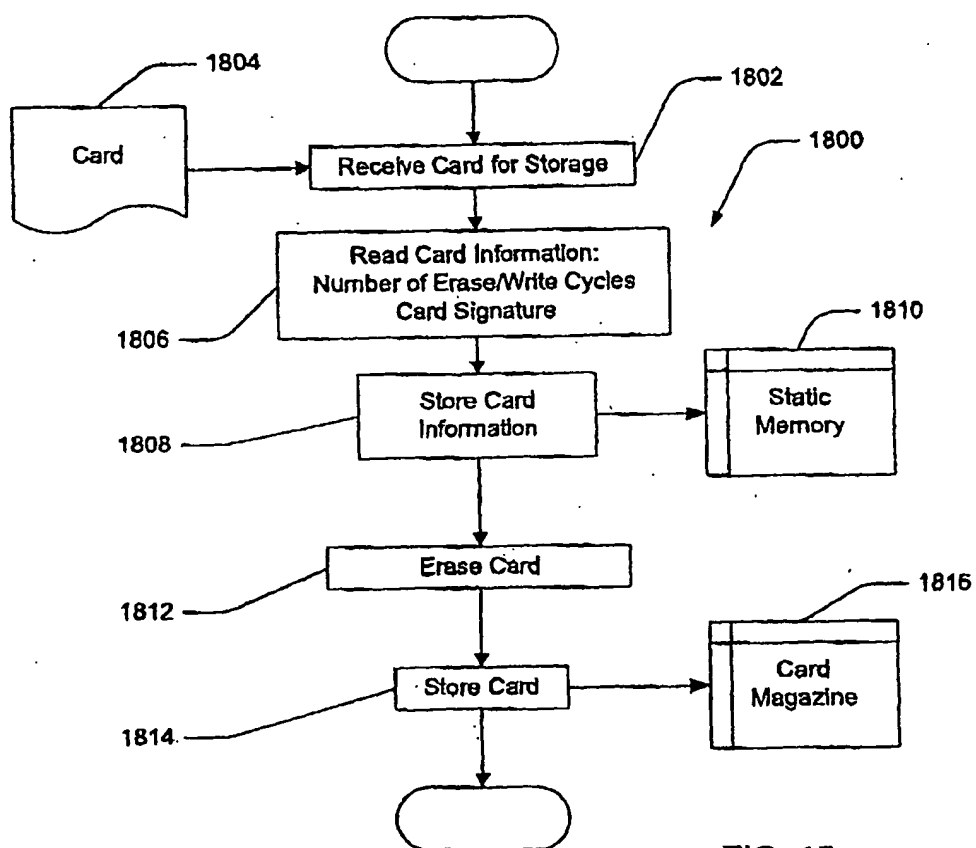


FIG. 18



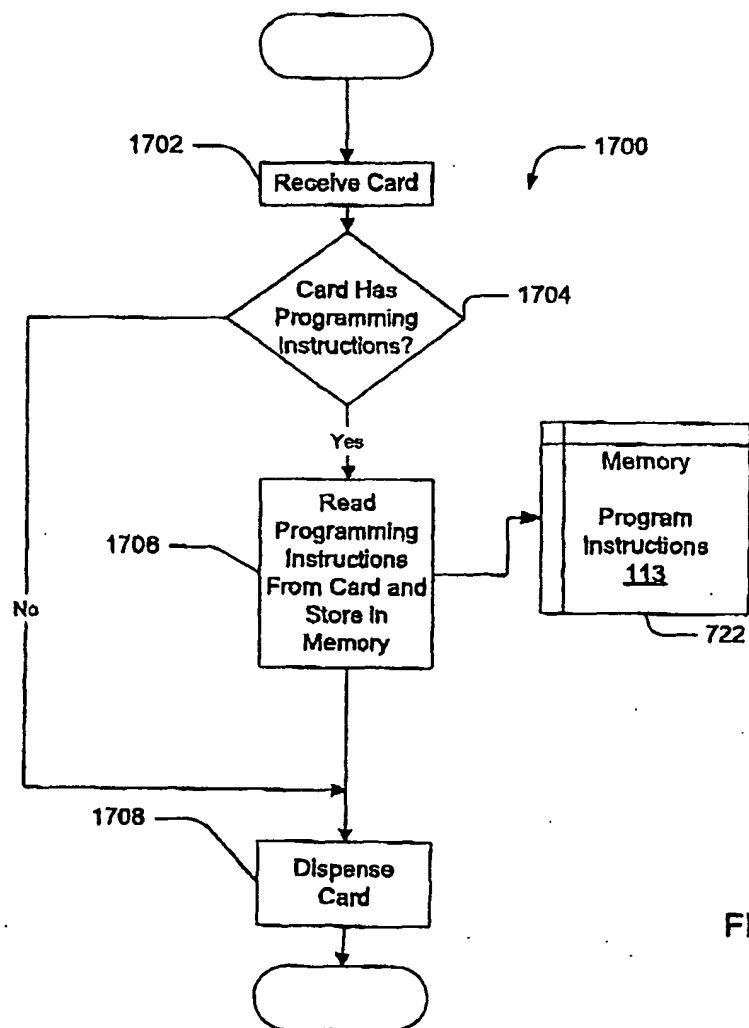


FIG. 17

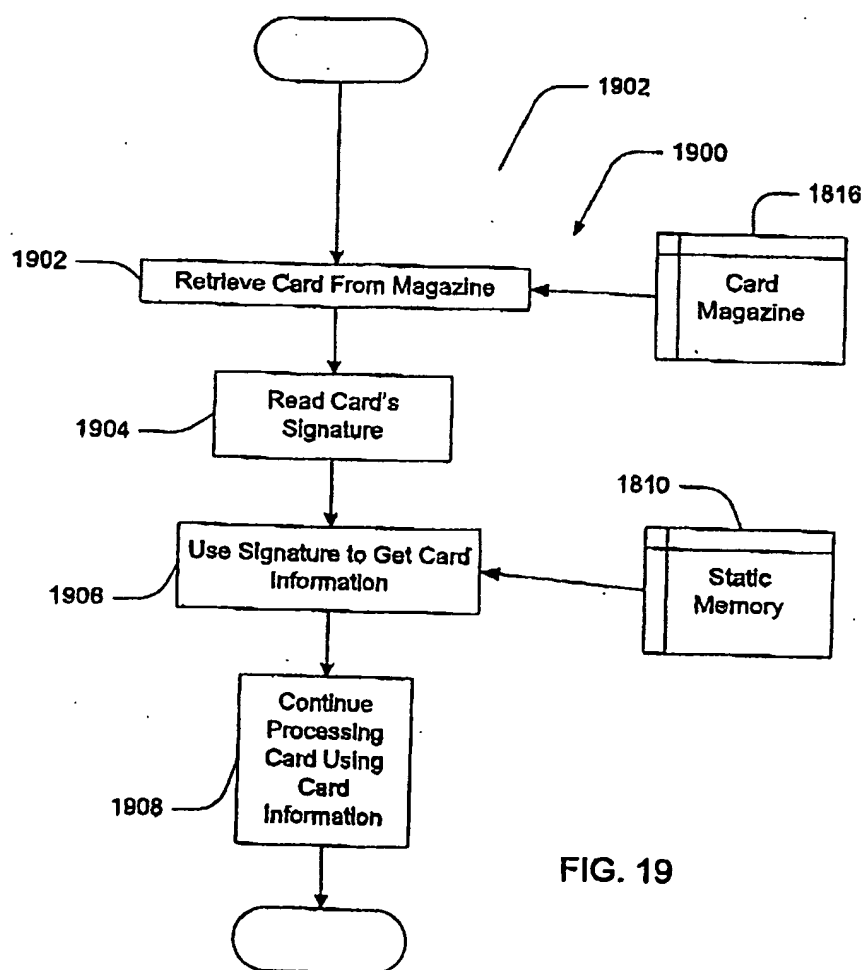


FIG. 19

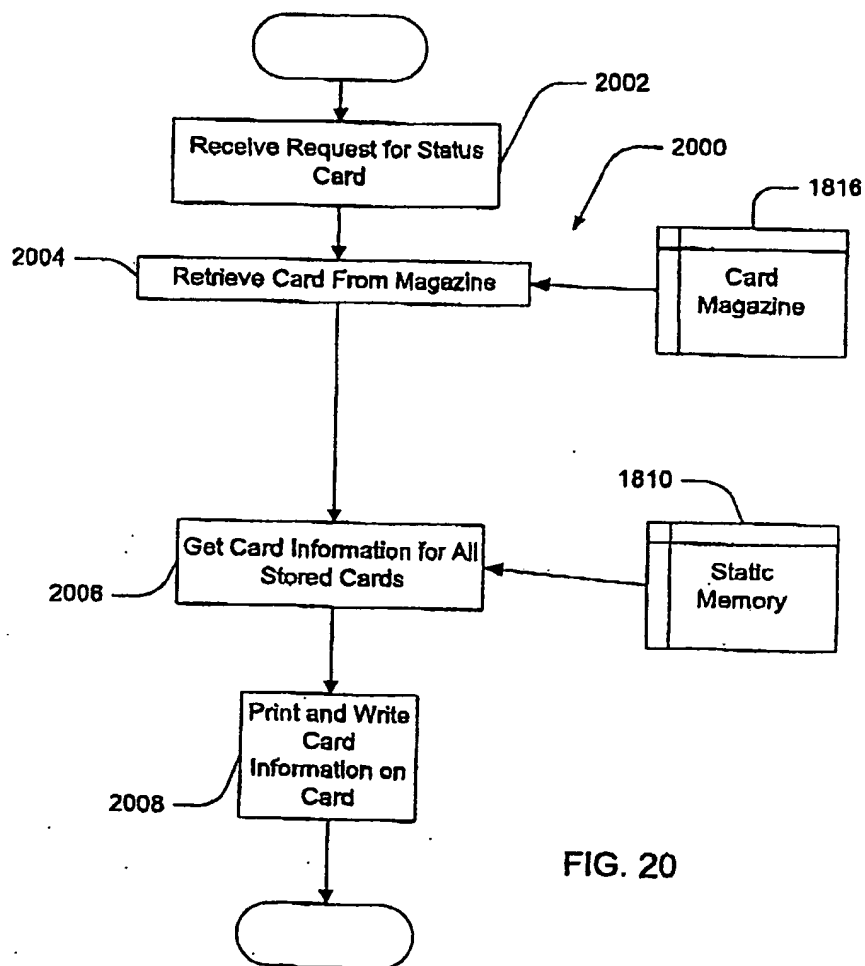


FIG. 20

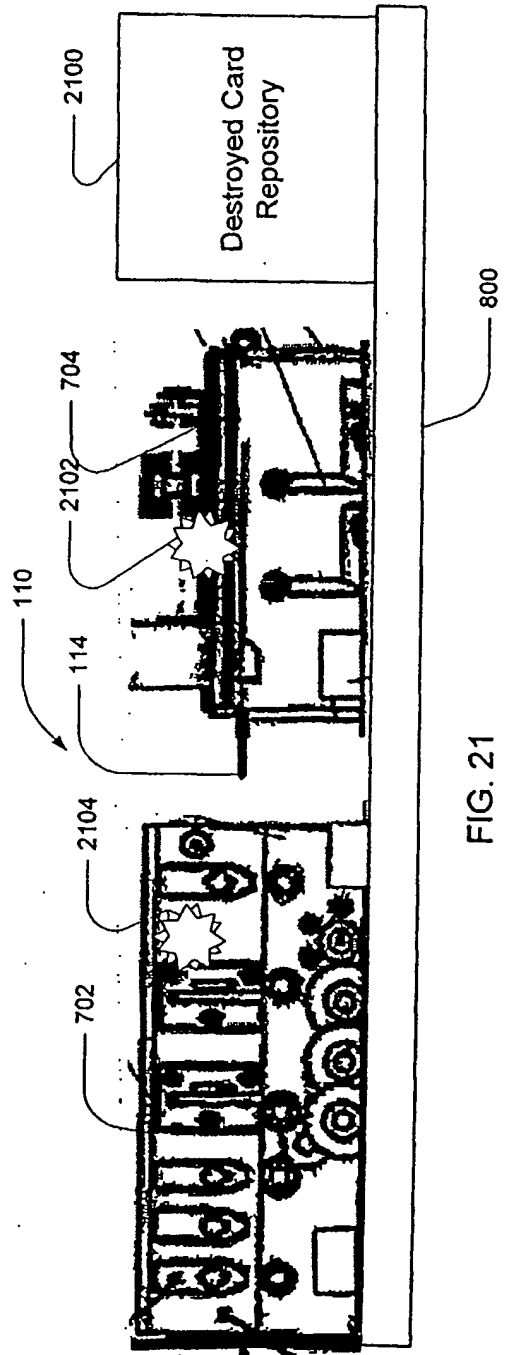


FIG. 21

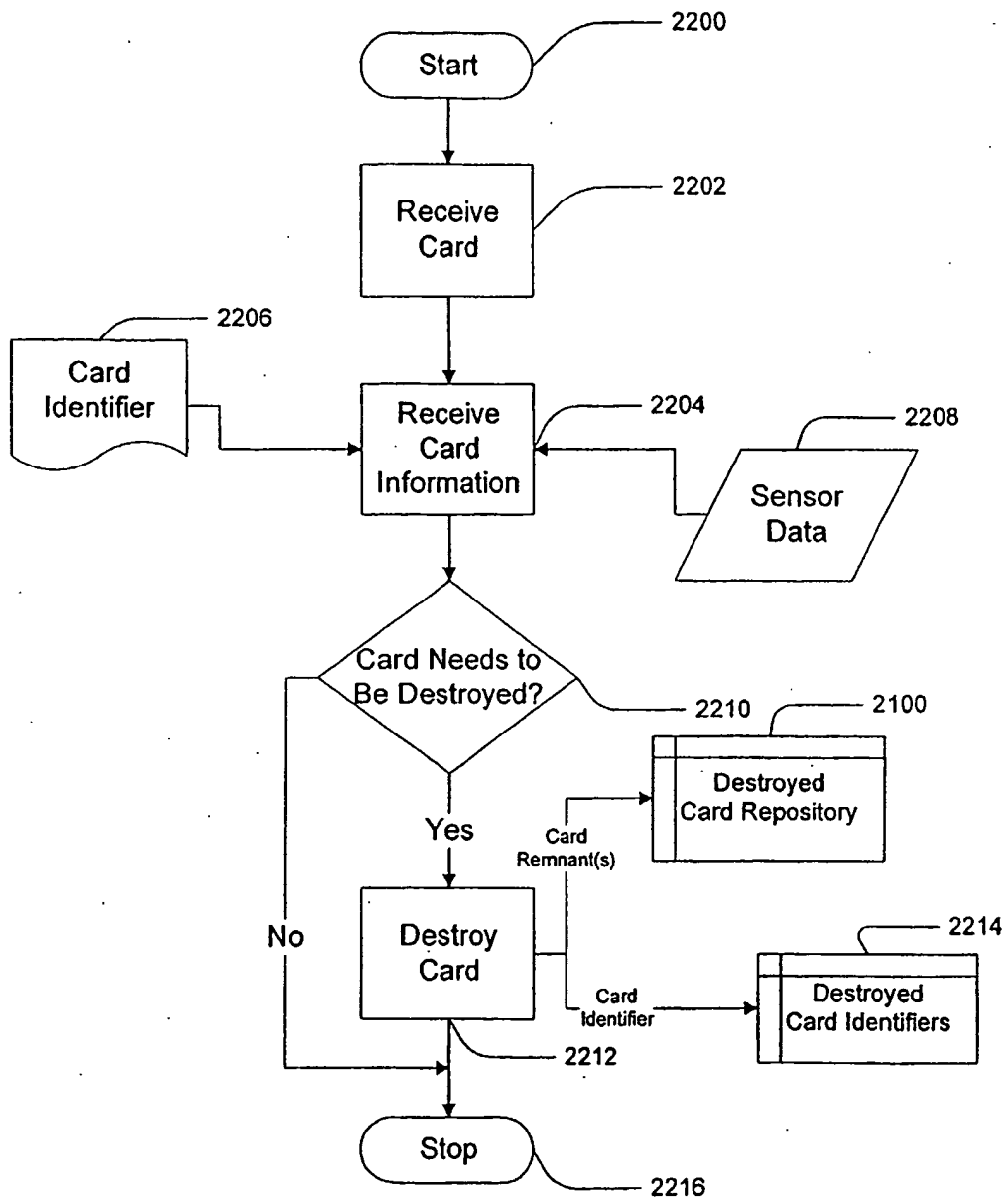


FIG. 22

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